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Contractors *and* Engineers Monthly

Vol. 49, No. 6

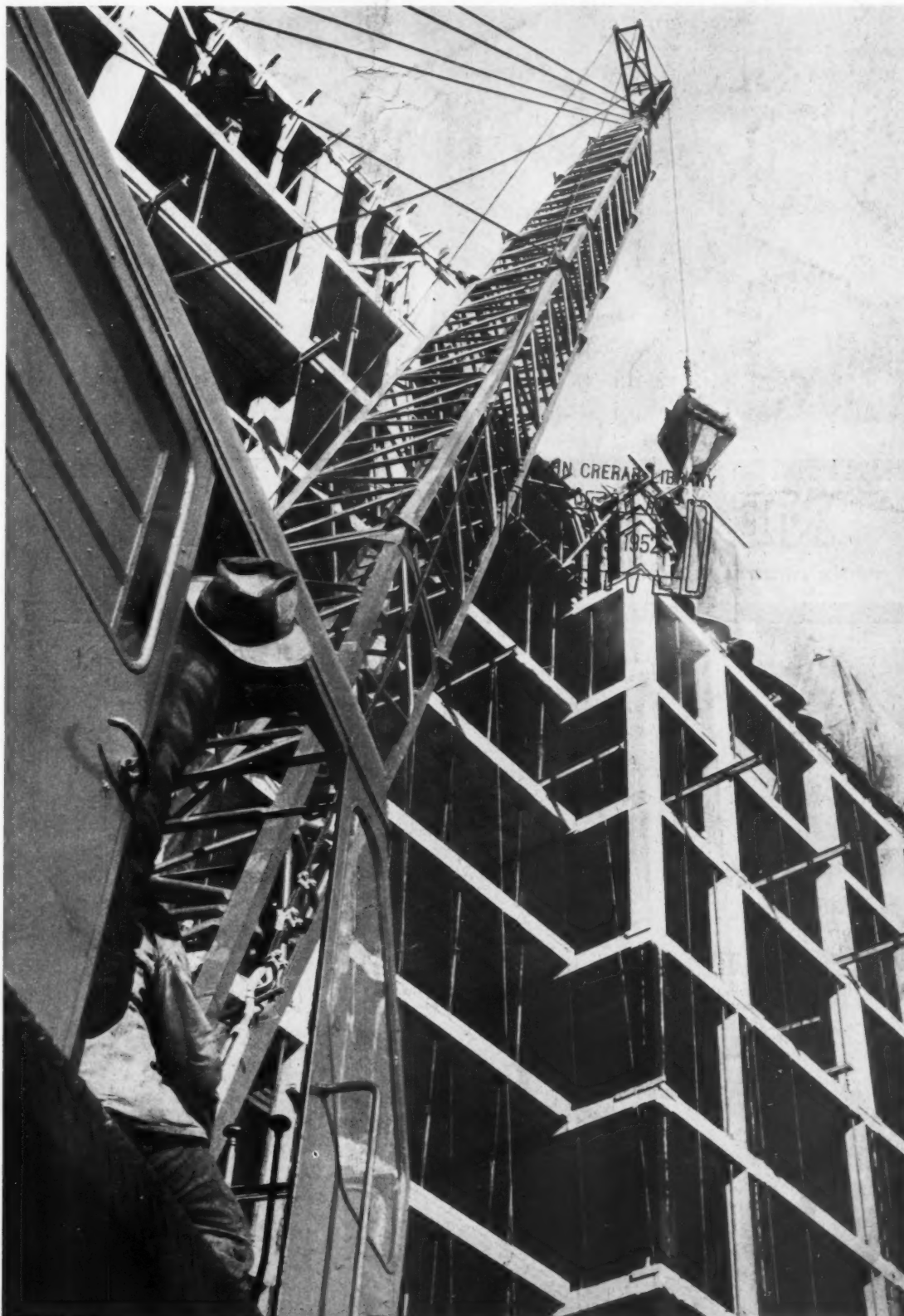
JUNE, 1952

\$4 a Year, 50 Cents a Copy



- **Powerhouse**
Ground water was only 2 feet down until wellpoints got busy. Then excavation proceeded in the dry. Turn to page 4.
- **Apartment and Store**
The apartment is of flat-slab design; one set of forms did all. See page 10. The store (pg. 85) was enlarged—in tight quarters, and despite steel delays.
- **Rugged Road Grading**
Blasting was tricky, since tracks below had to be kept free of slides. Page 14.
- **Pier Concreting by Night**
Truck mixers could make better time while Boston was asleep. Page 18.
- **Lock Built in Cofferdam**
Cheatham Lock—and a 36-cell sheet-pile cofferdam to confine the Cumberland River during the job. Page 24. Pix too.
- **Road Widened, Paved**
A crane with bucket handled concrete for the base course. Pavements both old and new got a blacktop cover. Page 29.
- **Welding Against Wear**
Want track links, rollers, and shoes to last longer? Try page 36 for tips.
- **Meeting Reports**
For what two experts said at a safety meeting in Pennsylvania—page 42.
For a briefing on Louisiana's Roadside Development Short Course—page 50.
For notes on the Purdue Road School and the ideas swapped there—page 82.
- **Sunk Dredge Raised**
They built a cofferdam on her main deck; pumps did the rest. The story on page 45 tells how she sank, too. Some yarn.
- **Air Force Base Expanded**
Wrecking, high-density earthwork, special base and macadam courses, and speedy concrete paving are the subjects, page 54.
- **Six-Lane Bridge**
A trestle and car float solved the problem of trucking concrete out to the four channel piers. Report on page 66.
- **Aggregate for Dam**
The pit was dirty but a shop-made scrubber turned the trick. See page 72.
- **Bituminous Paving**
A raveled road past an airport gets two courses of blacktop on a 12-inch water-bound-macadam base. Account on page 77.
- **County Lab Keeps Tab**
It designs pavements and checks construction from sieve stage on. Page 91.
- **Railroad Tunnel**
It was full-face digging until they struck an abandoned coal mine. Page 96.
- **Oil, Water, Sewer Lines**
The oil-line laying described on page 102 involved four river crossings.
The job reported on page 112 called for over 85 miles of water and sewer pipe.

(You will find an index on page 3.)



C. & E. M. Photo

As pours on the River House apartment building moved up toward the twelfth and top floor, this P&H 855 crane, with a 170-foot reach came in handy. Note the Acrow shores left in place to support the flat-slab floors—also the tarps against the February cold. Ferman Builders, Inc., was able to make one set of forms serve throughout. See page 10.



This spider web of steel is part of the roof of Ford Motor Co.'s new \$50 million research and engineering center at Dearborn, Mich. The building will be completed late this year. Much of the engineering to be done in it will be on national defense projects.

NEWS AND VIEWS

of the construction industry — jobs nearing completion, radio in flood-fighting



Mystic Pier No. 1 at Boston is scheduled for completion this month. For the story of Merritt-Chapman & Scott's contract, see page 18 of this issue.



Two-way radio helped win the fight against floods at Omaha and Council Bluffs this past spring. Using a Motorola-Talkie radiophone, this member of the Corps of Engineers keeps distant points informed of progress in dike building.



The Trenton-Morrisville Bridge across the Delaware will be completed about September 1. U. S. Steel's American Bridge Division is building it for the Delaware River Joint Toll Bridge Commission. This floating crane lifts a 30-ton 111-foot-long girder from a barge.

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RR Car Shortage: How You Can Help

Now that the construction season is in full swing, pressure on freight-carrying railroad cars will be heavy, according to the Association of American Railroads. Owing to a shortage of these cars, especially gondolas and flats, the Association has appealed to all contractors who use them, and to contractors' associations, with a view to "stretching" the ownership by more

intensive and sustained supervision.

The Association suggests four ways in which railroad-car users can help:

1. Gondolas and hoppers used for sand, gravel, stone, and slag should be loaded more nearly to capacity. Checks have shown that there is considerable room for improvement here, and a recent instance resulted in an average increase of 5 tons per car after on-ground handling with shippers. An average increase of 2 to 3 tons per car, the Association points out, would

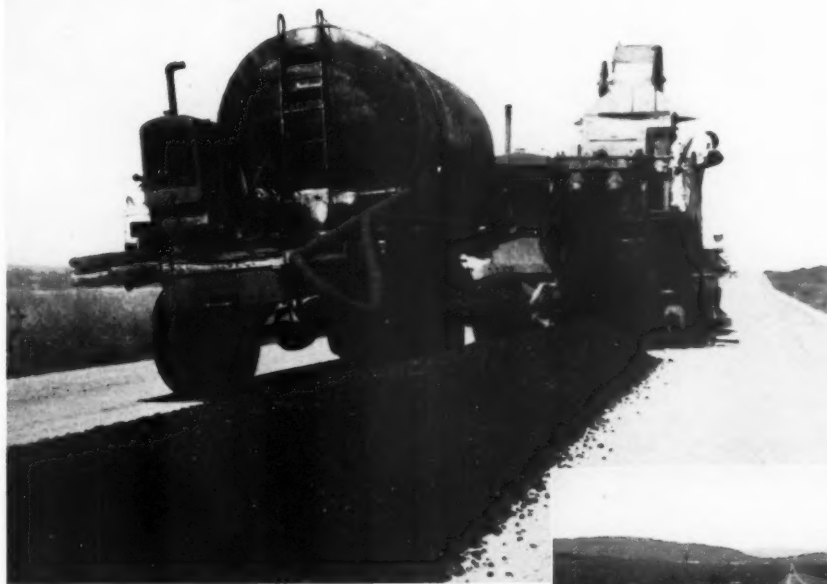
result in a substantial saving of cars.

2. The unloading of aggregates by clamshells often results in damage to the cars, with resulting loss of time and extra expense for repairs. Emphasize this to your unloading forces.

3. In some districts the supply of hoppers is greater than that of gondolas, and shippers and consignees may consider changing over to hoppers.

4. Prompt loading and unloading, particularly over week-ends, is of the greatest value.

A low-cost Texaco surface for a Black Hills highway



Texaco Slow-curing Asphaltic Oil and aggregate were mixed by travel plant in surfacing of this 10-mile section of South Dakota's Route 24 in the Black Hills area. Work done by the Northwestern Engineering Company, Rapid City, S.D.



The South Dakota Highway Department needed an intermediate-type of construction for 10 miles of State Route 24 in the Black Hills region. A travel plant and Texaco liquid asphaltic materials teamed up to give the State what it wanted—a serviceable, all-weather road at moderate cost.

A dense-graded aggregate was picked up by the travel plant from a windrow and mixed thoroughly with a Texaco Slow-curing Asphaltic Oil. The mix was spread evenly over the base and compacted, providing a tough, waterproof surface two inches thick. Texaco Rapid-curing Cutback Asphalts were used to prime the base and to seal the new surface.

This South Dakota project is another example of the variety of ways in which Texaco Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils are successfully employed in the construction of roads, streets and airports. There are two reasons why your Texaco Asphalt pavement will stand up under whatever traffic and climatic conditions it is called upon to serve: (1) The experience of almost half-a-century goes into the refining of Texaco Asphalt products; (2) Every Texaco Asphalt material is a product of scientifically selected crudes.

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Contractors and Engineers Monthly

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For the

Highway and Heavy-Construction Industry

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TEXACO ASPHALT

Wellpoints Dry Hole For New Powerhouse

High Water Table and Nearby River Present Problems, but
Two-Stage System Dries Site for Foundation Excavation

• WHEN ground water is encountered only 2 feet below the surface, and a river is but a few hundred feet away, a couple of factors are presented that cannot be lightly dismissed in the construction of a new powerhouse. Such were the foundation problems at the site for the new Plant McManus of the Georgia Power Co. near Brunswick, Ga. A Griffin wellpoint system, installed in two stages, dewatered the marshy area so thoroughly that excavation, pile driving, and concrete-placing operations for the foundation were carried out in the dry.

One header line was installed at elevation 6, a couple of feet below ground level. Another header was laid out 9.6 feet below the first line at minus 3.6 elevation. Risers 1½ inches in diameter x 21 feet long were spaced 2 to 4 feet apart along the headers, which were either 6 or 8-inch diameter. Five Griffin pumps were on hand for dewatering. Three electric units, two 10-inch and one 8-inch, were kept running constantly, with a pair of 10-inch gas-driven pumps reserved as standbys.

Plant McManus, named for the president of the Southern Co. and former president of Georgia Power Co., is being constructed on Crispin Island, along the left bank of the Turtle River in Glynn County. It is 5 miles northwest of Brunswick, and 1.3 miles west of U. S. 25 and U. S. 341 between Brunswick and Jessup. The main building, 127 x 205 feet, will house a single 40,000-kw steam-driven turbo-generator unit which is expected to go on the line the latter part of this year. The plant is designed to permit enlargement and expansion of facilities to an ultimate four units with a total capacity of 160,000 kilowatts. Standard Construction Co. of Columbus, Ga., is general contractor.

A "Jungle" Site

When the Seaboard Construction Co. of Brunswick, Ga., the clearing and

grading contractor, began work on the \$5,000,000 project in December, 1950, the 1,000-acre site had all the appearances of a jungle. A makeshift road, thrown across a causeway from the mainland, offered access to the sub-tropical island which was overgrown with trees and brush, and infested with cottonmouth moccasins.

Clearing was handled by a pair of Caterpillar tractors—a D7 and D8—equipped with front-end root rakes. The causeway was reconstructed to

(Continued on next page)



C. & E. M. Photo

A Griffin pump outfit in the hole gets down to the dewatering job with two 10-inch electric pumps. The 8-inch header line at elevation minus 3.6 is on the left, and that at plus 6.0 is on the right.

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serve as an embankment both for a new highway and a railroad spur. Borrow for road and railroad embankments was obtained from a pit on the mainland, a mile haul to the job. An old bridge that was part of the causeway was removed, and the gap filled in with dirt. When finished, the embankment dike was about 1,900 feet long, with a top width of 45 feet to accommodate both the railroad track and the new road. Crown elevation ranged from 10 to 12.

The spur track, 1.8 miles long, connects to the Atlantic Coast Line railroad, where a new freight station known as McManus, Ga., was established primarily to serve the power plant. The 1.3-mile road that ties in to the main highway is known as Crispin Boulevard, and has a blacktop pavement 20 feet wide.

Grading

Grading for the approaches and at the site totaled over 100,000 cubic yards. During construction of the causeway, the weight of the surcharge forced out at the sides the unsuitable muck, which otherwise would have had to be removed yard by yard. At the site proper, several deposits of muck, 2 to 3 feet in depth, were removed by dragline and hauled away in trucks.

A fleet of 12 dump trucks hauled in fill from the borrow pit. When the roadway was up to grade, an 8-inch base course, 20 feet wide, was constructed of limerock and clay-gravel soil in equal parts. The limerock came from Ocala, Fla., while the clay-gravel was obtained from the vicinity of Augusta, Ga. The two materials were dumped on the road, spread out by motor graders, and then mixed together by Seaman Pulvi-Mixers. After that, the base was shaped and compacted by rubber-tire rollers until it reached a stabilized density of 250 pounds to the square yard. It was then given a bituminous surface treatment. Shoulders are 4 feet; sideslopes are 4 to 1.

Building the Plant

With rail and highway transportation to the site all set, work on the plant itself began progressing. A warehouse and office were the first buildings to go up, and the Georgia Power Co. proceeded to supply its contractors with compressed air, water, power, and light facilities. The compressor house, a frame building on a concrete foundation, was outfitted with two electrically driven compressors—an Ingersoll-Rand and Chicago Pneumatic—that delivered air at the rate of 750 cfm and at 75 to 125-psi pressure.

A 44,000-volt line was strung 8 miles to the site from a Georgia Power Co. transmission line on the Jacksonville Highway. A substation was built at the plant to step the voltage on this 3-phase 60-cycle ac current down to 2,200-220 for use with construction tools and equipment.

Water was obtained from an artesian well that was driven 990 feet into the ground and yielded 1,186 gpm at 12-pound pressure. The well supplied water for the concrete, and will be used for drinking and sanitation purposes in the operation of the plant. Water is pumped into a 25,000-gallon tank elevated 120 feet above the ground, measured to the overflow mark. Cooling water for the boiler condensers will come from the Turtle River.

Wellpoints Required

Excavation for the plant itself totaled about 22,000 yards and was handled by three draglines with 50-foot booms and Hendrix buckets—a Link-Belt Speeder 1½-yard, a Northwest ¾-yard, and an Osgood ½-yard. At the start they loaded the material, mostly sand, directly into dump trucks. As the hole got deeper, one dragline worked on timber mats within the ex-



C. & E. M. Photo

As the hole gets deeper on the Plant McManus site, a Link-Belt Speeder dragline works on timber mats within the excavation. It casts the sandy material up the bank to a Northwest dragline which loads the trucks.

cavation, and cast up the bank to another dragline at ground level that loaded the trucks.

As soon as water was struck, the first stage of wellpoint header line was installed around the edge of the hole, a couple of feet below the surface. As the hole deepened and elevation minus 3.6 was reached, another header line was laid inside of and below the first system. Altogether about 1,200 feet of header pipe was used, with the water discharging up and over the side of the cut. Surface water within the excavation drained off through ditches to a sump hole, and from there was pumped over the side by a Jaeger 3-inch pump.

The draglines also excavated for the intake and discharge facilities to carry the cooling water from the river to the plant, and back again to the river. From the river an intake canal, 800 feet long, empties into a 350-foot intake tunnel, 11½ feet high x 8½ feet wide, that feeds the plant. On the way

(Concluded on next page)

FACT: They OUTWORK the rest



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Sure Grip, All-Weather—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Wellpoints Dry Hole For New Powerhouse

(Continued from preceding page)

out of the plant and before emptying back into the Turtle River, the water runs through a 225-foot discharge tunnel, 11 feet 6 inches high x 8 feet 2 inches wide, and then into a canal 1,200 feet long.

Reinforced-concrete tunnel walls are 2 feet thick. The canals have a maximum width of 80 feet on the surface, and are 20 feet wide on the bottom with 4 to 1 side slopes. Average invert elevation of the tunnel is minus 15.

On Pile Foundation

The big building is supported on 1,800 untreated-timber piles, 32 to 48 feet long, which have 8-inch tips and 12-inch butts, and are spaced as little as 3 feet on centers. They were driven to 20-ton bearing in hard-packed sand by a McKiernan-Terry 9-B-3 hammer operated by compressed air. The crawler rigs handled the hammer in 50-foot-long steel leads, and the driving was done from the bottom of the hole. Piles were cut off so that they projected 4 inches into the concrete of the foundation mat.

Under the brick smokestack, which will serve Units 1 and 2 of the power plant, there are 35 precast reinforced-concrete piles. These piles are 16 inches in diameter, octagonal-shaped, and 55 feet long. The stack is 163 feet high and tapers to a 17-foot diameter at the top.

Other pile work included driving 14,000 linear feet of treated-timber piles for the construction of a 350-foot dock along the river front.

Concrete Work

Over the untreated-timber piles in the plant building is a 3½-foot-thick reinforced-concrete mat, with the top of this slab at elevation zero. Foundation walls around the sides up to ground level are also of reinforced concrete and are 16 inches thick. The turbine-room floor is at elevation 12 while the roof is 87.5; the boiler-room roof is higher at 110 elevation.

The 750 tons of reinforcing steel for the structure were supplied by the Truscon Steel Co. at Birmingham, Ala., while the 10,000 yards of concrete were mixed right on the job in a Koehring 34-E paver, and placed by a bucket and crane in wooden forms. A Blaw-Knox batch plant, consisting of aggregate bin and cement silo, was set up on the site.

The Georgia Power Co. supplied Penn Dixie bulk cement which was shipped by rail from Clinchfield, Ga., while the contractor was responsible for furnishing the aggregate. Darex air-entraining agent was added to the mix. A 5½-bag mix with an average 3-inch slump gave 3,000-psi concrete at 28 days. Curing was done with water. Forms were constructed on the job, the carpenter's shop being fitted out with a DeWalt 14-inch table saw.

Oil-Burning Plant

Structural steel for the framework of the building was fabricated and erected under a separate contract. Above the foundation the walls consist of corrugated-asbestos siding, and the roof is a poured-concrete slab. The plant will burn fuel oil in its operation, and this will be stored in three tanks, 24 feet high x 150 feet in diameter, with a total capacity of 225,000 gallons. In case the plant should be operated on coal at any time, space has been provided at the site for the storage of 180,000 tons of coal which would be stockpiled 36 feet high. Yard work will be handled by diesel-powered locomotives.

Future expansion at the plant for additional units 2, 3, and 4, will be at the east end of the existing building, on the side away from the river.

An average force of from 75 to 100 men was engaged on the construction of Unit 1. For the Standard Construction Co., the general contractor, R. L. Blackman is General Superintendent, assisted by E. L. "Shy" Mullis, Superintendent on the foundation work. The work of the Seaboard Construction Co., contractor on the grading, was supervised by Clinton Crosby, Superintendent.

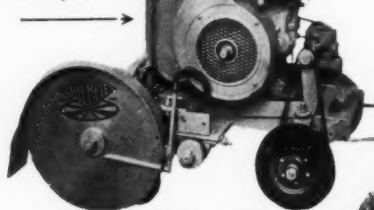
The Georgia Power Co. is represented at Plant McManus by Joseph R. Mobley, Project Superintendent. C. E. Duke will be Plant Superintendent when it goes into operation.

Austin-Western Sales Staff

Don J. Phillips is now Sales Manager and J. Arthur Fitzenz is Assistant Sales Manager of the Austin-Western Co., Aurora, Ill., subsidiary of Baldwin-Lima-Hamilton Corp. and manufacturer of construction equipment. Both men have been with the company for many years.

CUTCRETE MODEL STT Concrete Saw

Single Trail Blade accommodates 8" to 20" blade Will saw to 8" depth

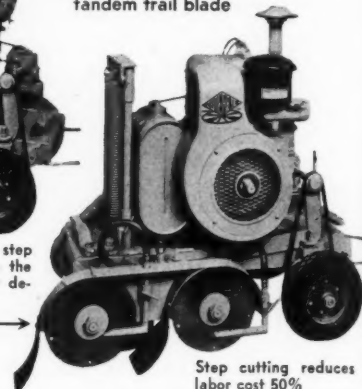


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MINNEAPOLIS-MOLINE

MINNEAPOLIS 1, MINNESOTA

A Spreader Box With Screw-Type Tailgate

A 4-wheel-mounted spreader box with a screw-lifting adjustable tailgate is announced by Wood Mfg. Co., P. O. Box 620, North Hollywood, Calif. It measures and forms stabilized base, road-mix, or hot-plant materials into uniform windrows.

The unit attaches directly to a dump truck and measures the materials as the truck moves along. The select or imported material flows from the truck through the adjustable gate of the Wood spreader box and onto the base in one operation. Windrow capacities up to 8 cubic feet are controlled by the adjustable tailgate.

The Wood spreader box saves straightening up dumped materials which are unmeasured, and eliminates guesswork by assuring controlled quantities of materials, it is claimed. The company also points out that its box meets the growing trend on the part of engineers to specify that materials dumped on the roadbed must be measured.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 171.

Shortens Truck Models

A conventional-type truck tractor capable of hauling 35-foot semitrailers in states where 45 feet is the over-all length limit has been announced by the Motor Truck Division of International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. A 6-inch reduction in length from the standard models provides a 102-inch bumper-to-back-of-cab dimension on truck models ranging in size from Model L-185 to the six-wheel Model LF-210.

The 102 Space Saver offers truck operators the length-saving features of cab-forward or cab-over-engine truck tractors, yet retains the driver comfort, styling, and utility of conventional trucks, the company says. The 102-inch dimension was achieved without changing the location of the driver's seat or the usable space within the cab.

Thirty-five-foot trailers with oval or round noses, or square-nose types with rounded corners, may be combined with the short-dimension conventional tractors without exceeding 45-foot length limits.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 175.

Rubber-Hose Assemblies

A catalog on rubber-hose assemblies for construction equipment is issued by Carlyle Rubber Co., Inc., Dept. I, 64 Park Place, New York 7, N. Y. It describes and gives costs and specifications on hydraulic, paint, lubricating, and multipurpose hose assemblies. It stresses immediate availability and hose assemblies made to your own specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 190.

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The Wood spreader box features a screw-lifting adjustable tailgate which controls windrow capacities up to 8 cubic feet.

Flame-Resistant Canvas

A catalog on flame-resistant fabrics for protecting construction or cargoes is issued by Philadelphia Textile Finishers, Inc., 104 Lafayette Ave., Norristown, Pa. It describes the structure and basic characteristics of Flamefoil canvas. Illustrations show how laboratory tests check the mildew, water, and fire-resistant qualities.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 174.

Death of G. C. McClure

George C. McClure, Executive Vice President and General Manager of Hercules Steel Products Corp., Galion, Ohio, died suddenly from a heart attack on April 26, at the age of 46.

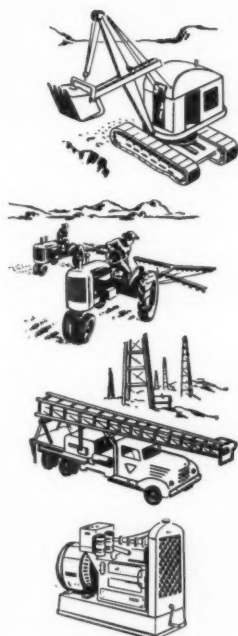
Mr. McClure had been connected with Hercules since 1920. In 1948 he was promoted to Executive Vice President and recently took on the additional duties of General Manager.

THE CERTAINTY OF A SPARK



THE BUYWORD FOR DEPENDABLE IGNITION . . .

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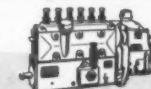
Components for Aircraft Engines



All Electric Windshield Wipers



Ignition Coils



Diesel Fuel Injection Equipment

Conveyor Model Now Mounted on Tractor

A 30-foot conveyor which handles concrete, gravel, sacks, and most types of free-flowing material can now be mounted on International Farmall tractors and powered hydraulically. The Con-Vay-It Special 12-30 will move wet concrete at the rate of 1 to 3 cubic yards per minute.

Models for both the Farmall Cub and Super A are built of one 20-foot and one 10-foot flange-bolted section. The belt is 12½ inches wide. The boom is made of 14-gage channel and has an over-all width of 15 inches. Angle side plates are welded to the side channels of the boom to form a trough.

A hydraulic pump is driven through a flexible coupling by the tractor power-takeoff shaft. It powers a large fast-acting hydraulic ram jack which raises and lowers the conveyor, and a hydraulic motor which drives the belt at speeds from 1 to 400 feet per minute. The belt can also be reversed.



A Con-Vay-It Special 12-30 Conveyor mounted on a Farmall Cub elevates wet concrete from a truck mixer. It is said to operate at 1 to 3 cubic yards per minute.

The company claims that the conveyor and supporting frame can be mounted by 2 men in 3 hours. Extra

weights are required on the left wheels. Further information can be secured from American Conveyor Co., 1115 W.

Adams St., Chicago 7, Ill. Or use the Request Card at page 16. Circle No. 143.

Booklet on All-Wheel Drive

A booklet describing the all-wheel drive for Ford trucks is available from Marmon-Herrington Co., Inc., Indianapolis 7, Ind. It features constant-velocity universal-joint steering ends which permit the driven shaft always to rotate at the same speed as the driving shaft.

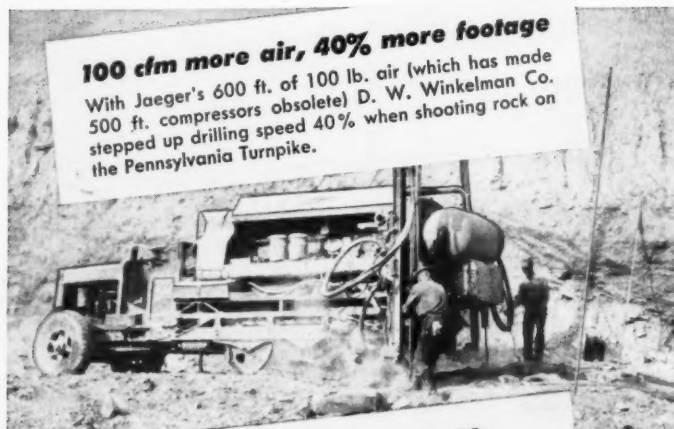
The auxiliary transmission compensates for the difference in travel between front and rear wheels in turning corners. The tandem rear drive is the torque-reaction type which resists the tendency of the axle housing to rotate and also holds the bogie assembly in proper relation to the propeller shafts.

The booklet also illustrates the range of Ford trucks with all-wheel drive and gives complete specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 189.

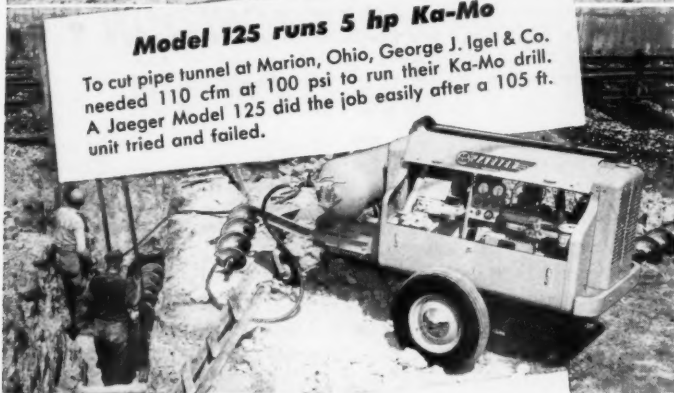
Air-starved tools get up and go with Jaeger "air plus" pressure

100 cfm more air, 40% more footage
With Jaeger's 600 ft. of 100 lb. air (which has made 500 ft. compressors obsolete) D. W. Winkelman Co. stepped up drilling speed 40% when shooting rock on the Pennsylvania Turnpike.



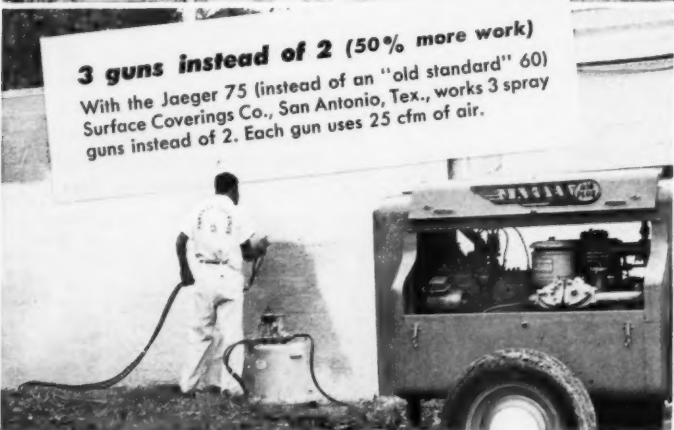
Model 125 runs 5 hp Ka-Mo

To cut pipe tunnel at Marion, Ohio, George J. Igel & Co. needed 110 cfm at 100 psi to run their Ka-Mo drill. A Jaeger Model 125 did the job easily after a 105 ft. unit tried and failed.



3 guns instead of 2 (50% more work)

With the Jaeger 75 (instead of an "old standard" 60) Surface Coverings Co., San Antonio, Tex., works 3 spray guns instead of 2. Each gun uses 25 cfm of air.



Want to cut costs? See your Jaeger dealer—or send for Catalog JC-1

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PUMPS • MIXERS • AGGREGATE SPREADERS • CONCRETE SPREADERS, FINISHERS

"Our Hydra-Lift has replaced a much larger, more expensive crane on this pipe stringing job,"

says Mr. James B. Ramsey, Chief Engineer and Superintendent, Municipal Water Works, Kansas City, Missouri



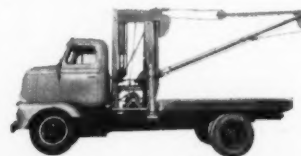
The Kansas City Water Department, in the construction of a new water main in Kansas City, North, is using a Pitman Hydra-Lift to load and string more than 7 miles of 16 and 20 inch cast iron and concrete pipe. The pipe weighs up to 3,600 pounds per joint.

Formerly, the water department shuttled a large mobile crane back and forth from pipe yard to job site to load and string the heavy pipe. Now they have a Hydra-Lift mounted on a tractor-trailer, and this single unit does the loading, hauling and stringing that formerly required two pieces of equipment. "It's the most economical way I know of, and I don't know where else we could get as much lifting power for the money," Mr. Ramsey says in regard to the Hydra-Lift.

The Water Works owns a second Hydra-Lift that is mounted on a 1½ ton flatbed truck. It is in daily use for pickup and delivery of pipe, valves, and fittings, and for setting hydrants. They expect to buy a third Hydra-Lift soon.

Because Hydra-Lift is a versatile truck-mounted crane that combines lifting power with mobility, it has become an important working tool for contractors, municipalities, utilities and others all over the country. It is easily mounted on the frame of any truck 1½ tons or over. The hydraulically-powered boom swings in a complete 180-degree arc and lifts through an arc of 100 degrees; boom telescopes from 12 to 17 to 22 feet. Lifting capacity is 6,400 pounds.

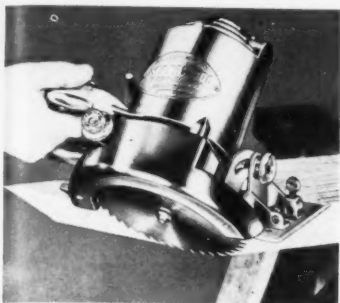
Chances are, you're doing some job right now that you could do faster and cheaper with Hydra-Lift. Write today for full information on this new inexpensive truck crane.



PITMAN MANUFACTURING COMPANY

300 West 79th Terrace

Kansas City, Missouri



The Mazaw 700 features light weight minimum bulk, and hard-biting blades.

Portable Electric Saw

A portable electric saw which makes all cuts in 2-inch dressed lumber at a 45-degree bevel cut is announced by Cummins Industrials, division of Cummins-Chicago Corp., 4740 Ravenswood Ave., Chicago 40, Ill.

Its light weight and minimum bulk are made possible by putting the pivot point of the saw shaft closer to the saw shoe and the work. The Magic Pivot design was developed by Fred Wappat and is now exclusive with Cummins.

The saw uses hard-biting "stub-radius" blades, which are said to put more power at the cutting edge, reach farther through 2-inch dressed lumber at a 45-degree bevel cut, and retain their cutting capacity longer after repeated sharpenings.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 161.

Monthly Weather Map

A monthly weather map of the U. S. which makes daily predictions by cities and areas is marketed by Blewett Weather Service, 919 E. California St., Pasadena 5, Calif. The 11¼ x 17½-inch map is printed in three colors and is sent out on a yearly subscription basis. The company reports that 1 to 2-day forecasts have averaged 85 to 95 per cent accurate. Special area predictions in 10-day periods up to 6 months in advance are also said to be dependable.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 194.

Carbide-Tipped Drill

A 4-point carbide-tipped drill steel is announced by Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa. It is made in 1½ to 2¼-inch gage sizes and in lengths up to 12 feet, with shanks to fit any hammer. As the alloy drill steel and carbide bit are of one-piece construction, there are no attachments to



The Intra-Set carbide-tipped drill steel is now available in a 4-point model—sizes 1½ to 2¼-inch gage.

loosen, bind, or strip. The manufacturer claims that the Intra-Set steel drills fast, has little gage loss, requires little sharpening, and is long-lived. It is also said to drill a neat round hole for follow-up work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 138.

Highway Department Booklet On Forty Years of Progress

The Kentucky Department of Highways has put out a booklet called "4 Years and Forty", which records in pictures highway development in that state during the past forty years, with particular emphasis on the most recent

four-year period.

Contrasting pictures on every page show how concrete and steel bridges have replaced covered bridges and toll ferries; how the modern gasoline-tax toll of 0.6 cent per mile pays for a comfortable trip over new highways as against the slow 3-cent per mile trip over old toll roads; how urban-highway construction has eliminated the bottlenecks that used to occur in congested areas; how pick-and-shovel maintenance on highways is a thing of the past; how increased traffic has necessitated the provision of safety-control devices and proper marking; and how, in rural areas, modern farm-to-market roads have replaced the old corduroy puncheon roads.

All these undertakings cost money, and, by the inclusion of totals spent on each type of improvement, the booklet gives the state's highway users an excellent idea of how their gasoline-tax dollars are being spent.

Raybestos Promotes Burrows

Harold H. Burrows is Sales Manager of the Industrial Rubber Goods Sales Division, Raybestos-Manhattan, Inc., Passaic, N. J. Mr. Burrows has been with the firm for many years, and, from 1942 until his present appointment, he was Manager of the Roll-Covering and Tank-Lining Production Departments. Charles P. McHugh succeeds him as Manager of these Departments.



Turning bog into runway *on Whidbey Island*

To speed the contract for a new runway at Whidbey Island Naval Air Station, Washington, Peter Kiewit Sons' Co. have used "Caterpillar" DW20 Tractors and No. 20 Scrapers on long, fast hauls.

The first problem was to remove 15 to 25 feet of bog that occupied the area, before making the fill. The contract called for moving more than 750,000 cubic yards of earth. "Cat" equipment on the job included 3 DW20 Tractors and No. 20 Scrapers, 15 D8 Tractors, a D6 Tractor, 5 No. 12 Motor Graders and 3 No. 80 Scrapers.

Material for the fill was rocky, sandy, very dry and hard to load, so that D8 push-loading was required. With pay loads of 17 cubic yards, the DW20s made the round trip of over 10,000 feet

at speeds that gave each unit an average of 125 pay yards per hour. Contributing to this efficient operation was the haul road, carefully maintained and kept in first-class condition at all times.

Good equipment is valuable property in these times. It's worth taking care of. A few minutes a day spent on proper maintenance will pay off in many added hours of profitable work life. Consult your "Caterpillar" Dealer. He's there to help you with all the service facilities at his disposal.

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TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Riverside Apartments Are of Latest Design

A Single Set of Forms Serves Throughout; Flat-Slab Design; Encased Plumbing; Cantilevered Balconies

(Photo on page 1)

• RIVER HOUSE is an appropriate name for the fashionable new apartment building rising out of the hillside on the east bank of the Hudson River. It is situated in Riverdale, a residential community at the very edge of New York City, and overlooks the river and the Jersey Palisades on the west bank. Ferman Builders, Inc., of New York City, erected the ultra-modern 12-story structure for the Hudson Drive Corp. under a negotiated \$1,500,000 contract.

The architect-engineer S. J. Kessler & Sons, also of New York, has embodied many attractive features in the design of River House. From the construction point of view, there is the completely fireproof reinforced-concrete frame; an American Bond three-shade-red brick facing; a flat-slab floor design encasing all plumbing and utilities; and cantilevered balconies that extend beyond the building line. Residents of the apartment may not appreciate all of these features but they will enjoy the architectural planning



C. & E. M. Photo

Contractor on River House, in Riverdale, N. Y., was Ferman Builders, Inc., New York City. One set of forms served for the twelve stories.

Contractors told us what they needed...

Builders told us what they wanted...

BERGER engineering did the rest...

developed this

NEW MODERATE-PRICED INSTRUMENT LINE for BUILDERS and CONTRACTORS

They wanted instruments that would stand rough usage—without being down for costly repairs.

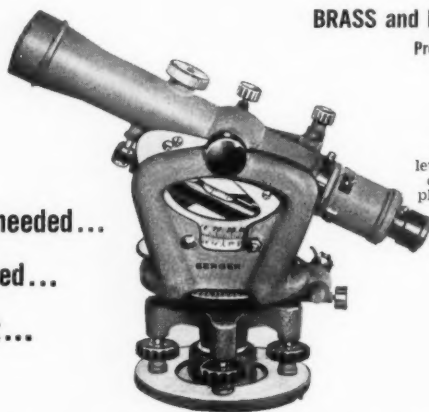
Accurate performance, of course, but not high cost... simple construction, handy-to-use.

ABOVE ALL... they wanted instruments priced to fit their budget.

Berger put its 80 years of precision engineering knowledge to work—field-tested each improvement—checked reactions of contractors, builders, engineers for several years—produced the Berger "N" line of builder's instruments, of brass and bronze construction, precision-engineered but moderate in price.

The "N" line* incorporates many of the features for which Berger transits, levels, theodolites and alidades are famous—have been since 1871—uses the same materials. We've merely simplified the design to build this moderate-priced line!

You'll want to know more about these economical-to-buy, economical-to-use instruments. Write for literature and complete specifications—today.

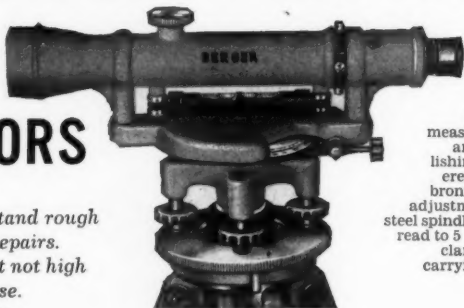


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Precision-Engineered Berger "N" Line

Convertible Transit-Level

For laying out and measuring horizontal and vertical angles, leveling, measuring differences in elevation, setting building lines, plumbing walls and columns. 12" erecting-internal focusing, hard bronze telescope; rack and pinion adjustment; 22 power coated optics; steel spindle. Verniers read to 5 min. Dust protected leveling, clamp and tangent screws. Steel carrying case. Code name COTRA.



Heavy Duty 12" Dumpy Level

For setting grades and lines, measuring or laying off horizontal angles, running profiles, establishing foundation elevations. 12" erecting-internal focusing, hard bronze telescope; rack and pinion adjustment; 22 power coated optics; steel spindle; horizontal circle. Verniers read to 5 min. Dust protected leveling, clamp and tangent screws. Steel carrying case. Code name CODEL.



Berger Hand Level

New, exclusive development. All parts permanently fitted... cannot go out of adjustment. Stabilized internal focusing. Interior permanently mounted level vial. Fully dust-protected. 6 1/2" long. Attached neck cord. Modern, convenient, inexpensive leveling instrument for preliminary surveys, construction work, road building. Top grain leather case with belt loop. Code name MANLE.



Service Transit-Level (Farm Level)

Adapted to needs of builder, farmer, landscape gardener, carpenter. 10-power, 10 1/2" erecting telescope; rack and pinion focusing. Cross hairs in fixed focus. Dust-protected bearings. Tripod legs of 1-piece construction with metal shoes. Steel carrying case. Code name CERLE.

Complete instruction manual with each instrument.

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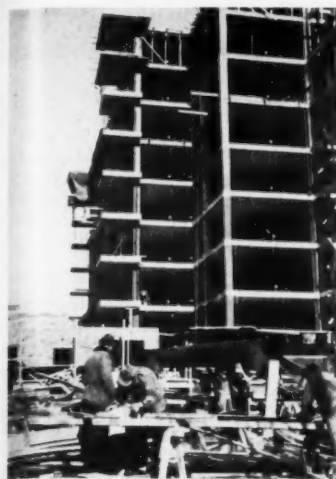
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C. & E. M. Photo

Note the completely cantilevered balconies which overhang the rear wall of River House. Carpenters in the foreground work out forming problems.

were able to roll right up on a paved drive in front of the project and chute the mix into a crane-held bucket or push buggies. Colonial also supplied the concrete for the superstructure. Harry Rich, General Superintendent for Ferman Builders, called for 3,500-pound concrete during cold weather and 3,000-pound the rest of the time.

One Set of Forms

While Tangredi was placing the last stages of the foundation, Industrial Engineering, Inc., subcontractor on the concrete superstructure, moved in to set up a carpenter's shop. Its superintendent, M. L. Hauck, decided to tackle the 12-story job with one set of forms. This worked nicely since all dimensions are identical above the second floor.

The first and second floors are 10 feet high, the others are 9 feet. This meant that after the first two pours all that had to be done was to cut down the column forms and then go up all the rest of the way without change. For this reason, Mr. Hauck had each form panel carefully marked and made sure that it was reset in the identical position one floor above, each time a pour was made.

The design of the building is neat, columns are at a minimum. The flat-slab floor is monolithic with the columns, and the absence of beams and guides improves the looks of the ceiling. The ceilings, incidentally, will not be plastered. The speck call for filling minor holes with Bondcrete and then rubbing with a disk sander.

The 7½-inch floor slab contains all

of the plumbing and utility lines. The pipes run up behind the brick facing, near the outside columns, through the 9-inch spandrel (cored for this purpose), and pass through the slab to plumbing and heating fixtures. This eliminates all furring breaks on the insides of the rooms. The slab is reinforced with ¾ to 1-inch round deformed bars in two directions.

A CMC 14-inch bench saw did most of the form cutting on this job. The deck forms were ¾-inch plastic-coated plywood panels supported by 3 x 4 "beams" 16 inches on centers and 4 x 6 "girders" 4 feet on centers. Acrow adjustable shores spaced 4 feet apart held up the deck form assembly.

A ½-inch plastic-coated plywood panel with 2 x 4 corner posts and five Acrow clamps did the trick for the columns.

Winter Concreting

Industrial Engineering concrete crews started to work in December and worked through the winter months.



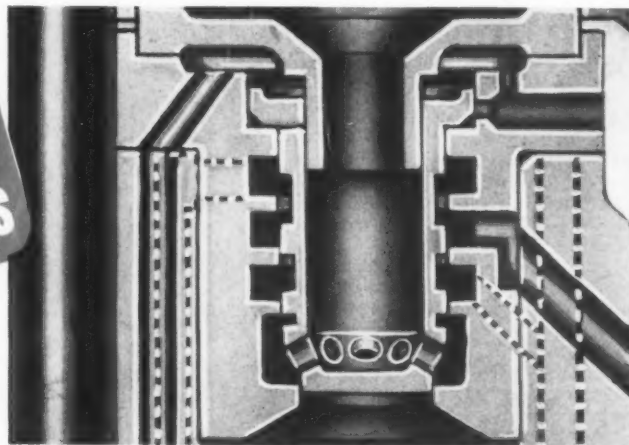
C. & E. M. Photo

A Vibro-Plus vibrator consolidates concrete after delivery to a floor-slab form.

They poured about one-third of the full floor area at a time, starting at the north end of the building. As the pours moved up toward the 119-foot top

floor, a P&H 855 crane came in handy. It had a 130-foot boom with a 40-foot jib and carried a 1¾-yard laydown

(Concluded on next page)



This valve makes them better

The valve used in Cleco RC-50 and RC-80 Paving Breakers is similar to the type used in many large mining drills. Since it controls *both live air and exhaust* during power and return strokes, it gives Cleco Paving Breakers more sustained power, faster action, less recoil and longer life than other breakers in their classes.

Hard biting and fast action result because air in front of the piston is exhausted to atmosphere—through the valve—during the entire power stroke. Live air—rather than pressure in front of piston—trips the Cleco valve for the return stroke.

Less recoil is a result of the valve action. Since air in back of piston is exhausted through valve during return stroke, avoiding recompression, less air is required to return the piston and recoil is reduced.

Longer life and sustained power between repairs is possible because valve action is independent of piston wear . . . a full stroke is assured even with a worn piston.

Many contractors report that Cleco Paving Breakers hit harder and faster, have less recoil, produce more work per man-hour and cost less to maintain than any other tools in their classes.

Write us, and a Cleco field engineer will arrange for a demonstration on your job at your convenience.



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233 2nd Street Hackensack, N. J.

Riverside Apartments Are of Latest Design

(Continued from preceding page)

bucket. A 12-ton counterweight on the tail compensated for the long boom. The center-lift cable setup prevented the boom from sagging in the middle when it was first lifted off the ground and gave it additional rigidity in operation.

The crane moved a 60-cubic-foot twin hopper along the front edge of the working floor as each new pour was started. The hopper held enough wet concrete to keep the push buggies busy while the bucket went down to street level for another load. Six Jackmanco buggies and two Vibro-Plus vibrators handled all of the work on this job. Pours averaged about 150 yards a day. The highest was 194.

The top surface of the concrete got a wood-float finish, except for the kitchen areas, where asphalt tile was to be laid. Here the finishers used a steel trowel. They broomed the concrete in the bathroom areas to take a good grip on the tile flooring.

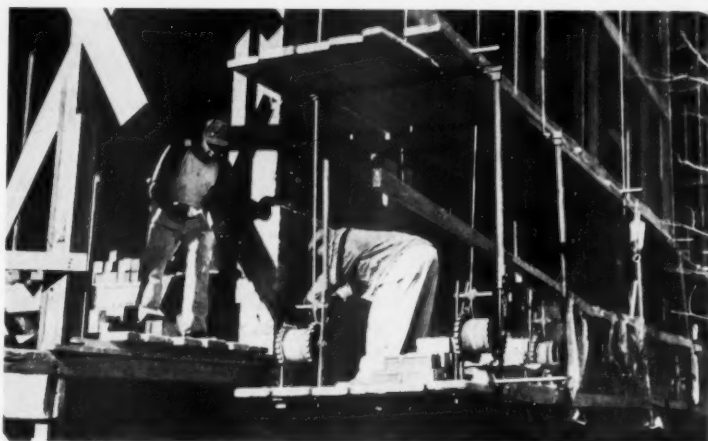
To protect the concrete during cold-weather work, salt hay was laid over the new pours and underneath 12 Superior salamanders were kept burning through the night. FlameZel fireproof tarps enclosed the entire area below the new pour to keep the heat on the forms.

Carpenters stripped the column forms the following morning and the floor forms two or three days later—depending on the weather. They replaced the shores and left them there, in some cases until the end of the job.

Cantilevered Balconies

Replacing the shores was particularly important with the balconies. At the front of the building, the balconies are supported on two or three edges, but at the rear they cantilever right out from the building line. They are 11 feet 8 inches wide and jut out 6 feet 4 inches. The ¾-inch-round top reinforcing steel is 6 inches on center and ties 2 feet into the main floor slab. The design is more than adequate for normal working loads—but not for the additional weight of the wet concrete transmitted through the shores of the balcony above. For this reason all shores were kept in place and the load of the new pour was carried through each succeeding balcony right down to the ground. Anti-Hydro was used to waterproof the concrete for the balconies.

A 4-inch course of three-shade-red brick, backed by 6-inch cinder block, forms the exterior wall of the structure. A clip channel, placed in a 2 x 2 wood shoe nailed to the floor slab, holds the ¾-inch vertical furring channels. Wire



C. & E. M. Photo

Bricklayers work from a Patent hand-hoist scaffold hung from seventh-floor beams.

lath and a coat of plastic finishes the wall on the inside.

The bricklayers worked from Patent

scaffolds. These were hung from aluminum beams anchored at the 7th floor (later the roof deck). The beams were

about 13 feet long, overhung about 6 feet, and were anchored to a U-bolt frame held by an eye-bolt embedded in the floor slab.

A 3½ x 5-inch angle-iron lintel encircles the 3rd, 6th, and 9th floors to relieve the brick wall of the load at these points. The brick is also tied to the frame at the columns. Wire twist-clamps, set in an inverted-U recess in the outside face of the columns, hold the brick veneer at every 5th course.

Safety

In spite of the fact that there were as many as 225 men working on this job at its peak, there was only one minor injury. Just a walk around the site told why. It was planned for safety. The flameproof tarps, a watchman for the salamanders, wire mesh on the scaffolds, dust masks for the grinder operator, a plastic guard on the bench saw, adequate bracing and shores for the forms, and good housekeeping on the floors and in the yard, were all evidence of good superintending.

"The time and cost of a TEXACO SIMPLIFIED LUBRICATION PLAN are incalculable!" —says General-Shea-Morrison Co.

"Not only is it more economical to use a small number of lubricants," says the contractor for Hungry Horse Dam, Montana, "but there is little chance of error in application... a big factor in keeping our equipment on the job and our maintenance costs low."

PRODUCTS USED IN TEXACO SIMPLIFIED LUBRICATION PLAN

1. **ENGINE LUBRICATION:** Use *Texaco Ursa Oil X***. This fully detergent-dispersive oil keeps both heavy-duty gasoline and Diesel engines clean... keeps harmful deposits from forming... guards against wear, rust and bearing corrosion. Maintenance costs and fuel consumption are both lower.

2. **CHASSIS LUBRICATION:** Use *Texaco Marfak*. It's tough, longer lasting. Won't jar or squeeze out of bearings, protects against dirt, rust, wear. More than 400 million pounds of *Texaco Marfak* have been sold.

3. **WHEEL BEARING LUBRICATION:** Use *Texaco Marfak Heavy Duty*. It seals out dirt and moisture, seals itself in—assuring longer bearing life, safer braking. No seasonal change required.

4. **CRAWLER TRACK LUBRICATION:** Use *Texaco*

Track Roll Lubricant. It gives long-lasting protection against dirt, water and wear. Reduces maintenance costs.

5. **AIR COMPRESSOR LUBRICATION:** Use recommended *Texaco* air compressor oils. There is one exactly suited to your particular operating conditions.

6. **ROCK DRILL LUBRICATION:** Use *Texaco Rock Drill Lubricant EP*. It has "extreme pressure" properties that give superior protection against wear. It guards against rust whether drills are running or idle.

Follow the *Texaco Simplified Lubrication Plan* for greater savings and convenience on every job. A *Texaco Lubrication Engineer* will gladly help you set it up to meet your particular conditions. Just call the nearest of the more than 2,000 *Texaco* Distributing Plants in the 48 States, or write *The Texas Company*, 135 East 42nd Street, New York 17, N. Y.



C. & E. M. Photo

Notice the dust mask as this worker finishes a concrete ceiling with a disk sander. Safety-consciousness was evident all over the Ferman job.

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STAR THEATER
starring MILTON BERLE
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every Tuesday night.
See newspaper for
time and station.

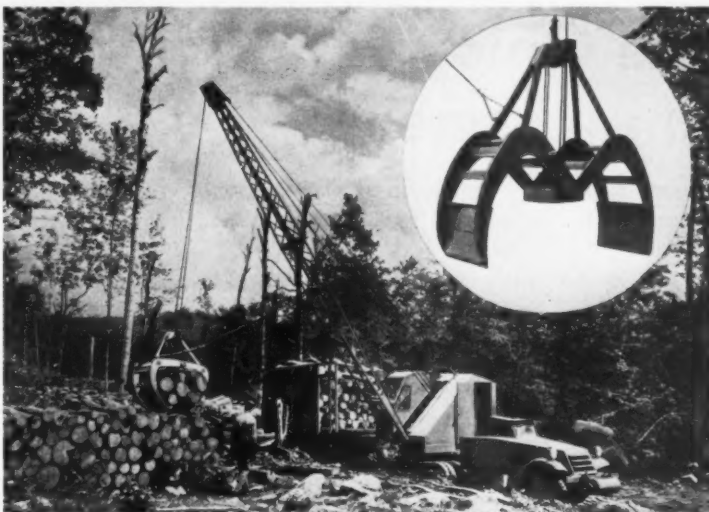


TEXACO

Truck-Crane Grapple For Lumber and Ties

An all-steel welded grapple for loading lumber, railroad ties, and similar materials has been announced by Schield Bantam Co., Waverly, Iowa, for use with the 5-ton truck-mounted Bantam crane. It is rated at $\frac{1}{4}$ -cord capacity (100-inch wood) and has a tong opening of 5 feet 3 inches with a gross weight of 1,155 pounds. Over-all length of the blade is 2 feet 8 inches, while over-all grapple height is 5 feet 2 inches. The grapple is constructed of cold-rolled steel shafting and angle irons with easily lubricated fittings and bronze bushings in the sheaves.

According to the manufacturer, the rig has loaded about 60 to 70 cords of partially frozen sticks a day, from small roadside tiers to trucks, with the Bantam crane operator and one man on the ground. This compares with a hand-loading rate of 50 cords per day under identical conditions, using a crew of 5 men. Under more favorable



The new grapple for the 5-ton-capacity truck-mounted Schield Bantam crane is said to load 4 cords of wood in 15 to 20 minutes with a crew consisting of the operator and one man on the ground.

test conditions the Bantam grapple has loaded trucks with a capacity of 4 cords in 15 to 20 minutes. The crane is equipped for tagline operation and can also work with tongs or sling.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 125.

Freezing and Thawing Tests on Aggregates

Three new tests on aggregate and concrete have recently been accepted by Committee C-9 of the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. They consist of rapid freezing and thawing in water, rapid freezing in air and thawing in water, and slow freezing and thawing in water or brine. A fourth method, slow freezing in air and thawing in water, is still under consideration. These three methods will be presented to the society for adoption at the Annual Meeting in June.

Committee C-9 on Concrete and Concrete Aggregates has also accepted an additional nondestructive test to be included in ASTM Standard C 215. This method analyzes the fundamental transverse and torsional frequencies of concrete specimens. It will make it possible to calculate Young's modulus of elasticity, the modulus of rigidity, and Poisson's ratio on concrete prisms and cylinders.

The committee is working on revisions of methods of examining aggregate, measuring the chemical activity of aggregates, determining organic impurities in sand, and measuring the cement content of hardened concrete.

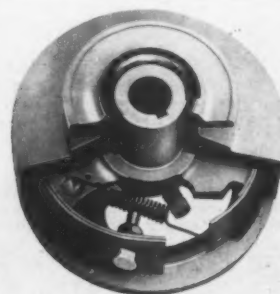
Centrifugal Clutch

An automatic centrifugal clutch for all standard engines from $\frac{1}{2}$ to 12 hp is made by Farm Easy Products, Inc., 1208 E. Centennial Ave., Muncie, Ind. It engages and disengages at adjustable engine speeds ranging from 600 to 1,500 rpm. Two set screws attach it to motors powering portable saws, conveyors, concrete mixers and vibrators, winches, and pumps, and to standby power units.

According to the manufacturer, the clutch has fewer than a dozen parts. It is operated by centrifugal force, which expands and engages the clutch band at the desired cut-in speed. This cut-in speed is adjusted by moving the band-tension spring, increasing or decreasing the tension holding the clutch band out of engagement.

Shaft and pulley sizes vary, and cut-in speeds are from 1,000 to 1,500 rpm on the small model, 600 to 1,200 rpm on the large model. The small model delivers from 1 to 4 foot-pounds of torque; the large model from 4 to 20. Oilite bearings are used in standard production, with ball and roller bearings available for some models. The clutch assembly is light in weight and can be installed on any standard crankshaft $\frac{1}{2}$ through $1\frac{1}{2}$ inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 177.



The Farm Easy automatic centrifugal clutch is designed for all standard engines from $\frac{1}{4}$ to 12 hp.

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Road Along the Ohio Widened to 4 Lanes

Heavy Grading in Sidehill Cut Features Highway Job; Excess Material Requires Long Hauls to Spoil Area

• A RUGGED bit of road reconstruction is currently under way in eastern Ohio where the State Highway Department is rebuilding a 3.1-mile section of State Routes 7 and 39 between East Liverpool and Wellsville. Running along the right bank of the Ohio River, the picturesque route is in Columbiana County, with West Virginia on the opposite shore.

The existing pavement, 20 feet wide, consisted of a course of brick laid over a concrete base. Several years ago it was resurfaced with asphaltic concrete. For the heavy traffic it carried, approximately 10,000 vehicles a day, the road was in need of improvement. It was too narrow, the alignment was bad, and the pavement was breaking up.

Accordingly the Department decided to replace the original road with a divided highway having a 24-foot reinforced-concrete pavement for each direction of travel. A grading, drainage, and paving contract was awarded to A. J. Baltes, Inc., of Norwalk, Ohio, on its low bid of \$1,518,226. The contract also includes the construction of a 166.5-foot concrete-slab-top culvert with a 22.74-foot span along the center line of the roadway. Work got under way in October, 1950, and is scheduled for completion late this year, due to some unforeseen slides.

Dual Highway

A normal cross section of the new dual highway shows a 4-foot-wide raised concrete strip separating the two 24-foot x 9-inch-thick RC pavements. The pitch on the pavement is from the inside to the outside edges at the rate of $\frac{3}{16}$ inch to the foot. Between the pavement and the divisor strip is the standard longitudinal key joint without tie bars. Under the pavement is a 6-inch blanket course of classified embankment material, 54 feet wide. This granular material also goes under the divisor strip and extends one foot beyond the pavement on each side.

Shoulders vary from 6 to 12 feet in width, and have a pitch of 1 inch to the foot. In fills the side slopes are either 4 to 1 or 2 to 1, while in cuts the slopes are 2 to 1. Sight distances along the vertical profile and the curves in the horizontal alignment are designed for vehicular speeds of 70 mph.

At one time a double-track electric trolley line paralleled the highway on the river side of the roadway at nearly the same grade. The State Highway Department took over the right-of-way of this abandoned railway, and incorporated the strip in its new dual highway. The narrow ribbon of land became a key factor in maintaining traffic during the reconstruction, since no detours were available. While the contractor was digging into the sidehill cut, widening the existing roadway and

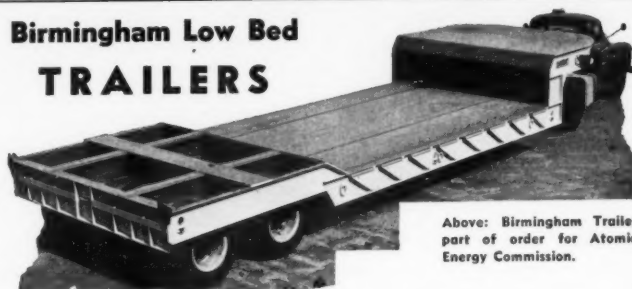
lowering the grade, traffic was routed over the old trolley roadbed that had been leveled off to a passable surface. Grading was limited to short sections at a time so that the distance where one-way traffic was necessary never became objectionable.

Railroad and Retaining Walls

Bordering the river at an elevation considerably below that of the highway profile are the tracks of the Pennsylvania Railroad. Consequently great

(Continued on next page)

Birmingham Low Bed TRAILERS



Above: Birmingham Trailer part of order for Atomic Energy Commission.

Standard models, or made to special design to meet your needs. Illustrated above is Model 131-16100 DLU, capacity 100 tons. This model is equipped with swinging side brackets, which increase 12' wide bed to 15' wide when brackets are extended. Frame electrically welded, open hearth steel shapes. Birmingham trailers give you greater load capacity, ease of handling and rugged wear.

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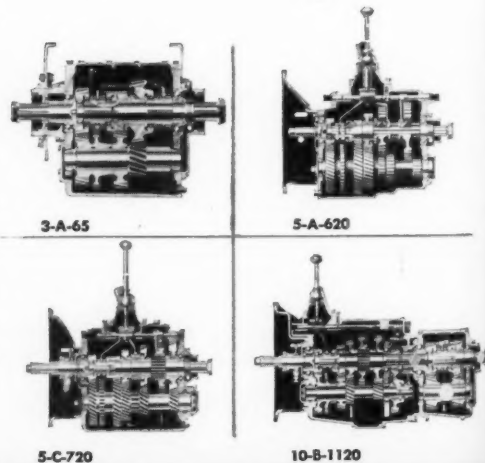
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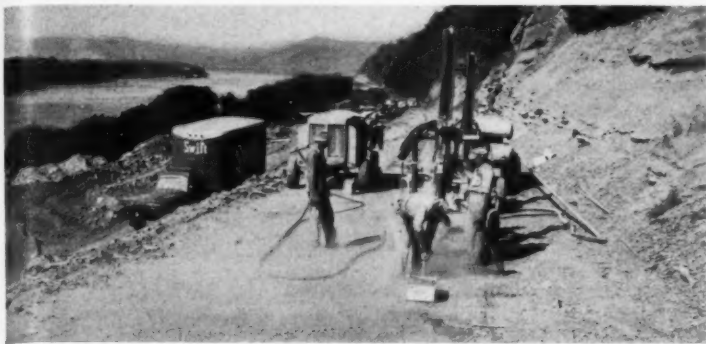
For further information and literature on products described in this issue, turn to page 16 for the Red Request Card. Our Reader Service Department will be glad to help you.

**Contractors and Engineers
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C. & E. M. Photo

Drill holes on a road-improvement job along the right bank of the Ohio are being charged with Austin Red Diamond dynamite. Two Cleveland wagon drills wait to do the drilling—the front one powered by the Le Roi compressor at left, the other by the Gardner-Denver compressor at right.

care had to be observed in blasting higher up on the slope in order to avoid slides that might reach the tracks. Only short sections of rock were shot at a time, and the number of holes drilled and charged was kept at a minimum.

One rock slide did occur in a fill 50 to 60 feet high and delayed operations considerably. A wet condition about 20 feet below the toe of embankment seems to have caused the unstable condition. The material was removed to solid rock and shale, and benches were made—the lowest along the railroad and about 20 feet lower. The material was stored and will be put back.

Three reinforced-concrete retaining walls were constructed at critical points to hold the embankment in place along the river side of the road. The longest wall, 435 feet, ranges in height from 11 to 25 feet and is 18 inches thick at the top. Of the other two walls, one is 255 feet long with an average height of 8 feet, while the other is 120 feet long x 6 feet high. All have RC footings and guardrail on top. Transit-mix concrete from East Liverpool was used in their construction.

Another wall, 400 feet long, has been built along an approach-road cut. This structure is an Armco metal-bin crib-type wall, with a maximum height of 18 feet, and is backfilled with porous material.

Grading Operations

While grading started in October, 1950, only a limited amount of work was possible that fall before winter closed in and brought operations to an end the middle of January, 1951. Work resumed in April, and the grading will be practically completed by this midsummer. The paving will be finished this fall. Roadway excavation totaled 465,000 cubic yards of which about 100,000 yards was rock. In addition there was 39,245 square yards of existing pavement, or about two-thirds of the old highway, that was removed and wasted.

Of the roadway excavation, about 100,000 yards was waste that was hauled away and spoiled, involving hauls up to 2 miles in length. In general the heavy cuts were at the lower end of the job, while most of the fill operations were at the upper or East Liverpool end, where several sharp curves were eliminated and some

buildings were relocated.

In one place in the sidehill grading there was a maximum cut of 58 feet measured from the roadway to the top of slope. A fill, measured in the same



C. & E. M. Photo

A LeTourneau dual tamping-roller unit pulled by a D7 tractor compacts the sidehill fill. On the right are the trolley roadbed and the old road.

way, had a maximum height of 100 feet. Soil material in this area varied greatly, including rock, shale, sand, clay, and cinders.

Equipment

For the rock excavation blast holes

were made with two Cleveland wagon drills employing 6 and 12-foot lengths of drill steel. Timken 2½ and 2¼-inch bits were used. A pair of 315-cfm compressors—Le Roi and Gardner-Denver—furnished air for the drills, while

(Concluded on next page)



DURAPLASTIC* scores another touchdown in Texas stadium

THE REFEREE is W. F. Swigert of Swigert Construction Company, Waco, Texas, contractor for Baylor University's huge new stadium. His verdict: "We are well pleased with the performance of Duraplastic in any type of construction."

Mr. Swigert says his firm has used Atlas Duraplastic air-entraining portland cement for years because "Duraplastic-made concrete is more workable, and there is less segregation of aggregates."

Important points! Duraplastic also minimizes water-gain, generally improves surface appearance, fortifies the finished concrete against the effects of freezing-thawing weather... and in paving, resists the scaling action of de-icing salts.

YET DURAPLASTIC COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Ave., New York 17, N.Y.



NOTE UNIFORM SURFACE appearance of concrete in close-up of this stadium job. With Duraplastic, less mixing water is needed for a given slump. The mix is more plastic and more uniform; aids proper placement.

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*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company

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"THE THEATRE GUILD ON THE AIR"—Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—September to June

Road Along the Ohio Widened to 4 Lanes

(Continued from preceding page)

Hercules, Atlas, and Austin Red Diamond dynamite charged the holes which were spaced on average 4-foot centers both ways. Heavy digging was handled by a 3500 Manitowoc 2½-yard Speedshovel. A Caterpillar D8 tractor-dozzer worked around the shovel in the cuts.

Even though the job was only 3.1 miles long, the hauls averaged about one-third of this distance and the material was moved with rubber-tired equipment. Dirt and rock were transported in four Euclids—two bottom-dumps and two end-dumps—averaging 13 yards a load; and five self-propelled scrapers that carried about 16 yards. The latter included one Tournapull, two LaPlant-Choate, and two Euclid scrapers.

Rock was spread in 3-foot lifts, while the dirt went down in 8-inch layers and was leveled off by a D8 and an Allis-Chalmers HD-19 dozer. Compaction was achieved with a LeTourneau dual tamping-roller unit pulled by a D7 tractor. Final shaping was done by a Caterpillar No. 12 motor grader. Working a 9-hour day, the contractor averaged 2,000 yards of material in place. An Insley ½-yard backhoe dug the trenches for the drainage pipe.

For the paving, the contractor has set up a concrete batch plant at the East Liverpool end of the job, and will haul dry batches to the paver. The 24-foot concrete roadways will be laid in 12-foot lanes. When one roadway is finished it will be turned over to traffic while the other is being paved.

Quantities and Personnel

The major items in the dual-highway contract include the following:

Roadway excavation	465,000 cu. yds.
Existing pavement removed	39,245 sq. yds.
Reinforced-concrete pavement, 9-inch	93,010 sq. yds.
Concrete for structures	1,513 cu. yds.
Reinforcing steel	1,83 tons
Concrete curb	7,774 lin. ft.
Seeding	222,483 sq. yds.
Concrete pipe, 12 to 36-inch	5,517 lin. ft.

A. J. Baltes, Inc., has employed an average force of 30 on the project under the supervision of Don J. Bethel, Superintendent. Edward Payne is Office Manager.

For the Ohio Department of Highways, G. D. Gonzales is Project Engineer. The work is located in the 11th Division of which D. Sever is Division Engineer with headquarters at New Philadelphia. The Department is headed by T. J. Kauer, Director. L. F. Schaeublin is Assistant Director and Chief Engineer, and Howard R. Craig is Chief Engineer of Construction.

Data on Hoists and Bodies

A bulletin on hydraulic truck hoists is now being distributed by The Perfection Steel Body Co., Galion, Ohio. It covers Models 720, 725, 820, and 825, which are used with the company's Series 100 and 200 bodies.

Body sway and weaving are reduced by two heavy lifting arms that impart an upward lifting motion directly to the understructure of the body through two rigid, widely spaced, lifting links. Body lift brackets are bolted to longitudinal sills, distributing power thrust to the entire understructure rather than to a small area of the body floor.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 200.

Bituminous Association To Hold Series of Meetings

The New York State Bituminous Concrete Producers Association plans to repeat this year the series of highly successful district meetings held throughout the state last year. In 1951

some 201 highway engineers and 80 city, county, and township officials attended the meetings together with 132 Association members.

Guests of the Association this year will be highway engineers and others interested in "the blacktop road with the velvet ride".

FIGURES AREN'T FOOLERS WHEN IT'S A.G.C. RATED

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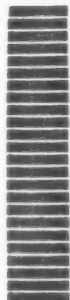
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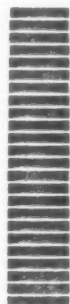
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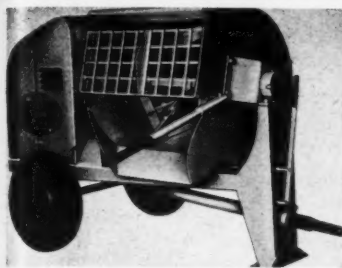
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Capacity of the Model 80 Muller plaster and mortar mixer is 6 cubic feet.

Plaster-Mortar Mixer

A 6-cubic-foot-capacity plaster and mortar mixer is announced by Muller Machinery Co., Inc., Metuchen, N. J. The Model 80 features a new shaft seal which replaces the conventional stuffing boxes and packing, and is designed to reduce friction loss and alleviate wear on the paddle shaft. Muller guarantees the seal against replacement during the entire life of the mixer.

Power is optional with a 4.5 or 7.7-hp Briggs & Stratton air-cooled engine or a 3-hp electric motor. Three sizes of wheels are also offered: 4.00 x 12, 5.50 x 16, or 4.00 x 8, with 20, 27, or 16-inch OD respectively.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 136.

A Fog-Spray Nozzle

A fog-spray nozzle for applying dormant oil-base sprays to weeds and brush has recently been developed by Bete Fog Nozzle, Inc., 85 Pierce St., Greenfield, Mass. The HX5 disperses a 10 to 20-degree fan spray pattern of fog droplets. There are no side horns or jets. It is lightweight and can be operated by one man.

The atomizing elements of the nozzle are a series of special narrow-angle fan spray disks. A 3-foot extension with bent applicator applies a horizontal sheet of spray near the base of the brush. The trigger-action shut-off further prevents waste by providing a positive control of the spray flow.

The HX5 nozzle operates with small supply hoses which can be carried over long distances to difficult places. A garden-hose thread connection is standard. Interchangeable spray disks are available in various sizes for different conditions.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 101.

Allis-Chalmers Memphis Mgr.

H. G. Karcher, formerly Industrial Sales Manager of the Kansas City, Mo., branch of the Tractor Division of Allis-Chalmers Mfg. Co., Milwaukee, Wis., is the new Manager of the company's Memphis, Tenn., branch. He succeeds the late G. M. Malmø.

Before joining Allis-Chalmers, Mr.

Karcher was President of the Karcher-Wolter Equipment Co., Chillicothe, Mo., and the Karcher-Wolter-Foley Co., Wichita, Kans., and later spent 2½ years with the War Department.

Line of Drilling Machines

A line of diamond-core drilling machines for making test borings, grout holes, or general soil explorations is described in a bulletin put out by Sprague & Henwood, Inc., Scranton 2, Pa.

The Model 40-C will drill 1,000 feet deep. It can be powered by a gasoline engine, diesel engine, an air motor, or an electric motor. Power is transmitted to the 360-degree swivel head and hoisting drum through a disk-type friction clutch and a built-in 4-speed sliding-gear transmission. Larger models for drilling deeper than 1,000 feet are also available.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 196.

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5 out of 6 Detroit Highway Contractors Choose FLEX-PLANE Portable Finisher

Of the six leading highway and airport contractors in Detroit five are using the new Flex-Plane super-portable Detroit Finisher—three have already reordered additional machines. This story is repeated wherever contractors have been exposed to the facts of this labor-saving, time-saving, quality-improving finisher.

The Detroit Special is maneuverability at its best. The built-in heavy-duty hydraulic transportation rig lifts the finisher off the forms and has it on its way to the next job in seconds! And improved gearing gives the Special extra speed on the forms.

Unmatched stability is a result of rugged framing and low slung design made possible by exterior screed mounting. Twisting, weaving and swaying on the forms is virtually eliminated, permitting finer surfacing.

The Special carries advanced-design Flex-Plane reversible screeds that have in-

tegral curb offset, drop screed, crown change and disengaging devices plus an infinite range of adjustment to permit synchronization, counter-synchronization, parallel stroking, quarter parallel stroking, etc.

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Concreting by Night Speeds Pier Facility

Truck Mixers Avoid Daytime Traffic Congestion in Pouring Large Apron Slabs for Mystic River Terminal in Boston

• IN order to maintain a smooth flow of transit-mix concrete for large slab pours of the new Mystic Pier No. 1 at Boston, Mass., the contractor did most of this work at night. Only in this way did the fleet of up to 20 truck mixers overcome the problem of traffic congestion, much of which was due to various bridge and highway construction projects being carried out in the area, including the construction of the Sullivan Square overpass. The extra preparations involved in the way of lighting the work area were compensated for by the steady progress achieved with the concrete placing.

Lighting for job needs was obtained both from floodlights tapped off utility lines, and from several portable generator sets spotted around the location. Concreting usually started at 8 p. m. and proceeded at the average rate of 120 cubic yards an hour until the particular pour was completed. Some sections of the apron slab contained as much as 1,000 cubic yards of material, but by 6 o'clock the following morning the concrete was all in place. By then the truck mixers had returned to the plant, well before the heavy motor traffic of the new day had started once again to cause congestion in the area.

Mystic Pier No. 1 was to be completed about the first of this month by Merritt-Chapman & Scott Corp. of New York City under a \$3,800,000 contract to the Port of Boston Authority. Work on the project began in August, 1950. The general contract included both the substructure and the superstructure, or pier shed. This three-berth freight terminal for ocean-going vessels is the second unit in the Authority's master plan for the development of Boston Harbor. Merritt-Chapman & Scott also built the substructure for the first unit—Hoosac Pier—in 1950. The superstructure was erected by the Volpe Construction Co. of Malden, Mass. The \$20,000,000 development program also includes a pier to be constructed on the East Boston side of the harbor and the development of harbor and railroad facilities along Northern Avenue, South Boston, as well as the modernizing of Castle Island Terminal.

Mystic Pier No. 1

Before any work was started on the new Mystic Pier No. 1, two old timber piers, known as Mystic Piers 46 and 47, were dismantled at the site along the Charlestown side of the Mystic River in the Inner Harbor. Immediately south, or downstream of this location, is the U. S. Navy Yard. The Hoosac Pier is just below the Government plant on the same side of the river.

The pier area juts out from the right or west bank of the river to provide berthing or wharf space on three sides. The 690-foot berth on the north side will accommodate one or two ships depending upon length; on the east or river side, the 468-foot berth will take one ship; two more ships, bringing the total to four or five, can tie up on the south side which extends back for 900 feet along the Little Mystic Channel. Part of this south berth can be used for handling bulk cargo without interfering with operations in the pier shed, since it extends beyond the pier-shed area. Truck and railroad transportation will enter the pier from the west side through a new roadway that will pass beneath the approaches to the south side of the new Mystic River Bridge.

Along the three water sides of the terminal are reinforced-concrete aprons, 75 feet wide on the north and south sides, and from 105 to 116 feet wide on the east side. A huge pier shed, 580 feet long (east-west) x 420 feet wide (north-south), extends partly over the aprons, leaving a 25-foot uncovered working apron on the north and south sides and a 20-foot uncovered working apron along the east or outer end of the pier. The terminal is served by five sets of railroad tracks connecting to the Boston & Maine Rail-



C. & E. M. Photo

Preparing for a night pour on Mystic Pier 1: electric lines are hooked up to a generator, chutes for the transit-mixers are in place, and reinforcing steel is all set. In the background is the Mystic River Bridge.

road terminal. A single track runs along both the north and south exterior aprons, while the remaining three extend through the center of the pier. The three center tracks are depressed so that cargo may be transferred di-

rectly from freight cars to the floor of the pier shed.

On Steel H-Pile Foundation

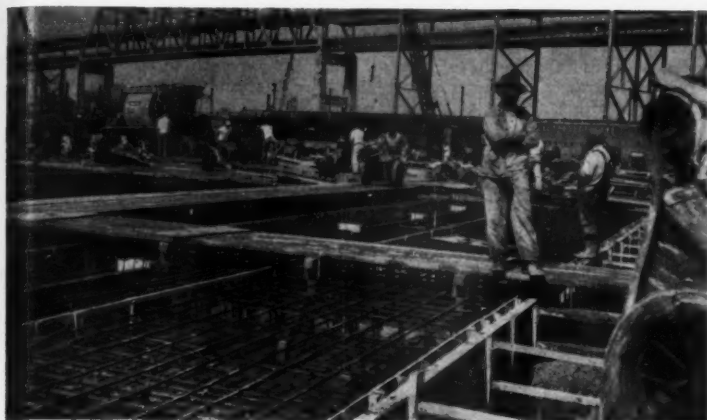
All three concrete aprons, and the (Continued on next page)

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These photos show the two concrete-placing methods employed in the pier: at left, buggies pushed over wooden runways; at right, concrete buckets emptied over the forms by crane. The concrete was transit-mixed in both cases.

columns for the pier shed that are located in the area inside the aprons, are supported on steel H-piles. Steel needs for the project—piles, structural, and

reinforcing steel—were supplied by the Bethlehem Steel Co. of Pottstown, Pa. Piles were mostly 10-inch 42-pound, 12-inch 53-pound, or 14-inch 89-pound

sections with total lengths ranging from 90 up to 150 feet. They generally came in lengths of 40, 50, and 60 feet, and were spliced together by welding as

they were driven, two or at times three splices being required.

Piles are spaced on an average of 8 x 11 feet on centers both ways under the aprons. In addition, batter piles are welded to the vertical piles in the outboard row around the perimeter of the pier, and also to the line of vertical piles which were driven parallel to the existing granite wall located near the center of the aprons. The outboard line of piles is toed in and the inboard line toed out; for both rows the batter is 5 on 12. Both land and floating rigs were used in driving the piles. All the piles that were located outside the old granite retaining wall that was part of original piers 46 and 47 were driven by floating equipment; about 60 per cent of the piles were driven from the water, while the remaining 40 per cent were driven from land. The old stone wall was leveled to the required grade and left in place, since it provides a retaining wall for the earth fill inside the concrete aprons.

Piles for the interior columns of the pier shed were all 10-inch 42-pound sections, averaging 110 feet long, and were driven in clusters of three; all are plumb. The three-pile concrete footings are in the shape of an equilateral triangle, with the sides measuring 7½ feet. Footings are 3 feet in depth. A total of 2,385 steel H-piles weighing 10,000 tons was driven for the new pier.

Heavy Equipment

For floating equipment Merritt-Chapman & Scott employed pile-driver rig No. 3 and three derrick boats—Cincinnati, Collegian, and the Warren. The No. 3 has 90-foot steel fixed leads. On the land work the driving rig also had 90-foot leads. Three Manitowoc Speedcranes with 85-foot booms either handled the piles or drove them in the shore operations. Most of the driving was done with fixed leads, only occasionally where space was limited were the leads laid aside.

Driving was done with McKiernan-Terry hammers, either the single-acting S-5 and S-8, or the double-acting 10-B-3. Steam was used with both floating and land equipment, portable boilers supplying the steam for the crawler rigs. Piles were driven through a stratum of soft blue clay from 65 feet to 130 feet thick, and into either hardpan or a combination of hard sand, gravel, and shells. They were driven to various bearings, from 30 to 120 tons, according to the loading designs. The single-acting hammers were generally used with the larger pile sections that were driven to the greater bearing capacities.

Pile driving began during January, 1951, and the pile drivers worked through the winter with excellent results. The weather was so moderate that the floating rigs were forced to shut down for but a single day, and the land rigs lost only six days. By the middle of May enough piles had been driven to permit a start on the con-

(Continued on next page)

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Concreting by Night Speeds Pier Facility

(Continued from preceding page)

crete deck for the apron.

Formwork

Constructed of reinforced concrete, the apron slab is 10 to 12 inches thick and is supported on RC beams 3 feet wide x 3 feet deep. These beams, laid out perpendicular to the outboard faces of the pier, rest on the piles with the steel projecting 9 inches into the bottom of the beams. Wooden forms for the beam and slab construction were hung from the piles. This was done by welding either 6 x 6 x 3/4-inch or 8 x 8 x 3/4-inch pieces of angle iron to both flanges of the H-piles, and building the forms up from them.

First 12 x 12 timbers were laid across these angle supports on both sides of the pile bents. On top of the 12 x 12's double wedges were provided to shim up to proper grade the 6 x 8's that were

put down next. The latter supported the 4 x 4 stringers, running the opposite way, over which was laid the 2-inch planking for the beam bottoms. Diagonal kickers from the 4 x 4's up to the sides of the beam forms furnished support for 2 x 6 stringers that were laid out from beam to beam. The 3/4-inch tongue and groove sheathing for the slab bottom was laid across the 2 x 6's.

All formwork was done on the job, the carpenter's shop being equipped with a Beach table saw, thus saving much hand labor. After the concrete had been cured, the forms were easily removed by knocking out the wedges over the 12 x 12 runners, and lowering the panels for use again.

Concrete Placing

Approximately 14,000 yards of concrete and 1,200 tons of reinforcing steel were placed in the pier. Transit-mix concrete, 3,000-psi strength at 28 days, was furnished by three different plants of the Boston Sand & Gravel Co. About 5 ounces of Daxex air-entraining

agent were added to each 5 1/2-bag batch. A fleet of from 16 to 20 truck mixers delivered the concrete after a 3 to 4-mile average haul. As previously stated, by working a night shift on all large pours, the contractor assured himself of a continuous supply of concrete without being tied up by traffic

congestion.

Besides the floodlights off the utility lines, the job was lighted by two Jaeger K5 motor-generator sets and two Kato-light 5-kw generators. Concrete was placed in two ways. In one method the transit-mixers discharged their

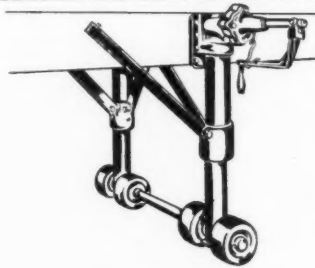
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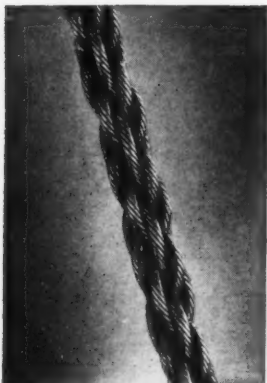
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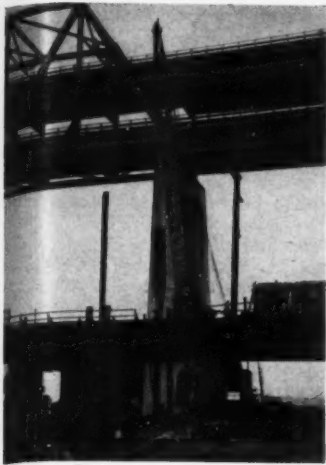
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C. & E. M. Photo

At the western end of the pier a McKiernan-Terry 10-B-3 hammer handled by a Manitowoc Speedcrane drives an H-beam pile through the decking of the old Chelsea Street viaduct.

contents into 1-yard concrete buckets that were emptied over the forms by cranes. In the other, the concrete was discharged into rubber-tired buggies that were wheeled over runways to the forms. As the concrete was placed it was vibrated with Master vibrators and screeded off by hand. There is a slight pitch to the outside of the pier for drainage runoff. The average elevation along the outboard side is 15.50 above mean low water.

The surface of the concrete was finished off with a Master Turn-A-Trowel, and the slabs were cured with water. Then the finished surface was given three coatings of Lapidolith, a liquid hardener. Steel expansion joints of the finger type are spaced about 200 feet apart along the aprons.

Steel Superstructure

The area inside the three concrete aprons of the pier and Chelsea Street on the west consisted of clay and gravel fill retained by a granite wall. A 3-foot layer of slag fill was placed over this existing fill in order to bring the subgrade to the required elevation. The slag was obtained from the Eastern Fuel & Gas Associates of Boston. Bethlehem Steel Co. both fabricated and erected the 1,800 tons of structural steel for the pier shed. Material was delivered by rail over the track laid along the north side of the terminal.

Trusses are supported by columns spaced approximately 39 feet apart in a longitudinal direction and 58 feet apart in a transverse direction. The transverse trusses support joists 39 feet long, spaced on 8-foot 4-inch centers, and Lastik lightweight precast-concrete roof deck that came in channel shapes—8 feet long x 2 feet wide x 1 inch thick at the center and 2 1/4 inches thick at the edges. Over the precast-concrete roof deck there is 1/2 inch of Weatherite Roofinsul roof insulation covered with a Barrett four-ply tar and gravel 20-year bonded roof.

For erection Bethlehem used two Lima crawler cranes working on the

slag fill; both had 75-foot booms together with 18 and 25-foot jibs respectively. A P&H truck crane with an 80-foot boom and a 30-foot jib handled the steel to be erected around the perimeter, and operated over the concrete apron. At the peak of the work four riveting crews were employed. The bituminous-concrete floor surface within the shed was laid after the steelwork was completed. This surface is 2 1/2 inches thick and was laid in two courses on a 3 1/2-inch penetration-macadam base.

Completing the Pier

Around the outside of the pier a treated-timber fender system was installed. The piles were secured to a 10 x 12 wale that was bolted to the concrete through 4-inch backing blocks that enable the wale to bend and hence

to provide a springing action. At the west or land end of the pier there are two loading platforms, 200 feet long x 16 feet wide, on either side of the triple railroad tracks running up the center of the terminal. Railroad cars and trucks can interchange cargoes at these platforms without interfering with operations inside the pier shed. Also along the land side of the pier are 10 loading areas for trucks. The pier shed has 52 Kinnear rolling steel doors, most of which are 18 feet wide x 16 feet high. Exterior walls consist of Philip Carey corrugated-asbestos siding, attached to the steel structure by stainless-steel studs welded by means of a Nelson stud welder.

Inside the pier shed at the land end on the north and south sides are two office spaces having a total area of 13,000 square feet. Their west eleva-

tions at the entrance to the pier are faced with brick. Also, at the pier entrance, there is another building that is part of the terminal facility. It is a two-story structure, 125 x 30 feet, of structural steel, cinder-block masonry, and brick facing, and it also has a precast-concrete roof deck. Batteries for the electric-driven cargo-handling pier equipment are charged on the first floor, while the second floor is used for a stevedores' hiring hall.

The berths are dredged to a depth of 35 feet below mean low water on the north and south sides, and to 40 feet on the east side where the berth is adjacent to the 40-foot-deep main channel.

Personnel

Merritt-Chapman & Scott Corp. em-
(Concluded on next page)

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Concreting by Night Speeds Pier Facility

(Continued from preceding page)

played an average force of 250 on the Mystic Pier No. 1 project under the direction of Charles Richardson, Project Manager, with Edward B. Crooks serving as Construction Superintendent. David Luprian and William Arnold were Job Engineers. The project was handled by the M-C&S New England Division, headed by Alfred M. Heaton, Resident Vice President, and based at New London, Conn.

The Port of Boston Authority was represented on the project by Charles F. Sullivan, Resident Engineer. The Authority is the agency of the Commonwealth of Massachusetts responsible for the construction of new piers and the over-all development of Boston Harbor. John M. Bresnahan is Director and George L. Wey is Chief Engineer. Harold M. Hallett is in charge of all pier construction.

The consulting engineer and architect for the Mystic Pier project was Thomas Worcester, Inc., of Boston.

The pier facilities will be operated by Mystic Terminal Co. which also operates Hoosac Pier.

Coated Salt Tablets Prevent Heat Nausea

Salt tablets for increasing workers' comfort in hot weather are made by A. E. Halperin Co., Inc., Boston 18, Mass. Hav-a-Lift Tabs are specially coated to regulate the absorption of concentrated salt and reduce the possibility of indigestion and nausea.

The company makes a tablet dispenser which can be hung near any water supply. When a plastic knob at the bottom is turned, a tablet drops into the palm of the hand.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 109.

A World's Safety Record

At the Savannah River Plant, which E. I. du Pont de Nemours & Co., Wilmington, Del., is building for the Atomic Energy Commission, a new world's safety record for the construction industry has again been established. From March 12, 1952, through April 19, 1952, employees of du Pont worked 6,275,072 continuous man-hours without a disabling injury, while from March 12 through April 12 all employees at the plant, including subcontractors, worked 6,121,979 continuous man-hours without a disabling injury. The du Pont record ended with a finger injury; the over-all record, with a head injury.

Last January 30 the Savannah River Plant also set a world's safety record. But that one—of 4,826,763 hours—is far surpassed by this new record.

Robert K. Mason, du Pont Field Project Manager for Construction, remarked that the insistent use of a number of very finely drawn safety techniques had gone far to produce these good results.

Gar Wood-Findlay Personnel

R. S. Jay has taken over the post of Sales Manager of the Findlay Division of Gar Wood Industries, Inc., Wayne, Mich.; R. M. Steegman succeeds Mr. Jay as Assistant Sales Manager in charge of Buckeye equipment; and David J. Davis is Assistant Sales Manager in charge of tractor equipment. Mr. Jay joined Gar Wood in 1948, Mr. Steegman in 1936, and Mr. Davis in 1940.

Gar Wood Findlay Division manufactures tractor equipment, scrapers, excavators, ditchers, fine-graders, and spreaders.



C. & E. M. Photo

Left to right: Charles F. Sullivan, Resident Engineer for the Port of Boston Authority; Charles Richardson, Project Manager for Merritt-Chapman & Scott; Captain Edward Crooks, Superintendent for M-C&S.

Earth-Moving Equipment

A catalog describing Ateco earth-moving equipment is available from American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif. It illustrates 2 and 4-wheel scrapers, front-end loaders, bulldozers, and rippers. The scrapers have heaped capacities from 2 to 12 cubic yards. Loaders are made with capacities of $\frac{3}{8}$, $\frac{1}{2}$, and 1 cubic yard.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 201.

S. K. Wellman Ups Romine

George L. Romine is Sales Manager of the Original Equipment Department of The S. K. Wellman Co., Cleveland, Ohio, manufacturer of Velvetouch brake linings and clutch facings. Mr. Romine, who joined Wellman in 1942, has had charge of original-equipment sales in the Cleveland-Detroit territory since 1947.

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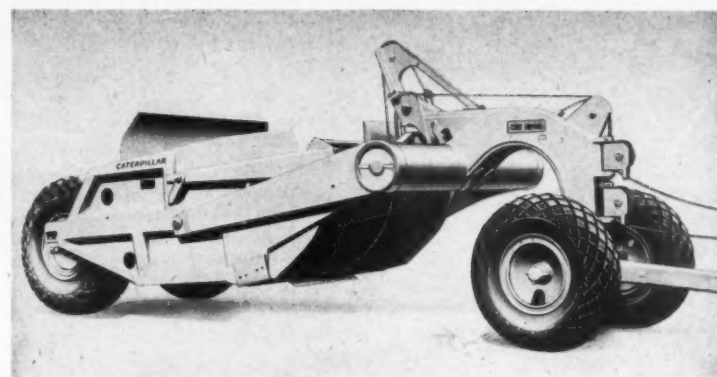
An adjustable clip for assembling structural steel for welding is available from J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y. The K3A offers a 1/4-inch adjustment to facilitate the erection of welded-steel multiple-story buildings. It supplements the standard K3 connection used in the Saxe welded erection system.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 132.

New-Model Scraper

A scraper for use with D6 tractor power is announced by Caterpillar Tractor Co., Peoria 8, Ill. The Model No. 60 has a flat-bottom bowl and a single blade. The reversible blade cuts a 7-foot 8-inch swath; the bottom is double with steel-beam fillers.

The scraper has a 7-cubic-yard struck and 9-cubic-yard heaped capacity. Top extensions or sideboards are available to boost this capacity to 8.3 cubic yards struck and 10.5 cubic yards heaped. Maximum carrying capacity is 11.5 tons.



Caterpillar's new No. 60 scraper for D6 tractor power.

The No. 60 has an unobstructed bowl, tapered roller bearings at the axles, induction-hardened sheaves, and bulldozer-type ejection. Operation is by means of a Caterpillar cable control available for attachment to the tractor.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 156.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 156.

What Society Asks Of Its Engineers

"We ask a great deal of an engineer. We require that he understand science, or at least that he have such a fundamental grasp of it that he can readily acquire a working knowledge of those aspects of any field of science which are ready for application. On the other hand we require that he be proficient in economics, in business, and moreover that he have a working knowledge of those branches of social science having to do with human reactions in organizations or in the market places. The second requirement is more severe than the first. Often it is met, not as a result of formal studies in the field, but as a consequence of practice, of living in a world of men, and of being alert and able to continue to learn."

"It would be a calamity, not only for the engineering profession but also for the public at large, if the engineer should abdicate his true position in society by failing to meet expanding demands and opportunities. As science becomes applied more widely it is essential that it be applied wisely as well. This involves much more than that the application should be a profitable one, bringing public benefit and maintaining sound industry, important though this is. The applications must be made with a keen realization of their ultimate effect upon society as a whole. The touch of the sound engineer, well grounded in all the interplay of human relations, is essential if we are to move forward to a wider use of science in our daily affairs and do so with true wisdom. The profession of engineering must grow with its opportunities and responsibilities . . .

"It is said that there may be a great lack of engineers in the years ahead. I do not think this is necessarily true if the scope of our profession is enlarged . . . Many of our greatest engineers in the past have come into the profession by unusual paths. There is no reason why we should not make engineers out of men from other fields if we need them, especially if they find among us a satisfying opportunity and they have the versatility needed for accomplishment under rapidly changing conditions. I think we can increase our number if we open up the unusual paths and if we regard the functioning of an engineer in a broader way than it is sometimes delineated. Certainly we are in changing times, and in order to encompass them and maintain the engineering profession in its proper sphere, we need to have a profession which can itself change and which can adapt. This is the challenge before the engineering profession. There is no simple formula for meeting it."

"Unfortunately, in our engineering education—and in industry, for that matter—we have often in the past lost sight of the importance of breadth and adaptability in our engineers. In attempting to become general we have often in the past merely become superficial. We need to learn how we can develop among our young neophytes and in our profession generally those attributes which enable men to adapt themselves to change soundly, neither rushing blindly and without understanding into the novel path nor remaining in a groove which leads nowhere except into oblivion . . .

"The engineering profession is an attractive profession, for its reach is broad and its contribution to human welfare is great. Its rewards are generous, in respected position in society and in satisfaction. It has new challenging opportunities before it. To meet these it must be courageous and versatile."

(Excerpts from an address by Dr. Vannevar Bush at a joint Founder-Society meeting held in New York City to celebrate the Centennial of Engineering.)

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ACROW Steel Shores are engineered and built from base to head for the fastest, safest, securest support on the job. Completely positive simple action leaves no chance for slippage. There is no cutting, wedging, or nailing to eat up time and money. And ACROW Shores have no jacks, levers, or supplementary tools to lose.

EXCLUSIVE ACROW SELF-CLEANING FEATURE makes possible rapid stripping operations. A unique patented extension of the collar nut extends over a segment of the threaded tube (see left). When collar handle is turned in stripping operation, encrusted concrete, dirt, and grit are removed from the thread—making ACROWS instantly ready for use on the next job.

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	Fully Closed	Fully Extended		Fully Closed	Fully Extended	Fully Closed	Fully Extended
1	5 ft. 7 in.	9 ft. 10 in.	46	10.96 tons	8.97 tons	8210 lbs.	6720 lbs.
2	6 ft. 7 in.	10 ft. 10 in.	49	10.50 tons	7.90 tons	7840 lbs.	5975 lbs.
3	8 ft. 2 1/2 in.	12 ft. 5 1/2 in.	56	10 15 tons	7.55 tons	7490 lbs.	5600 lbs.
4	11 ft. 0 in.	15 ft. 0 in.	69	7.27 tons	2.89 tons	5225 lbs.	2050 lbs.

Standard 6" x 6" Beam Type 14" x 4" J Head 14" x 4"

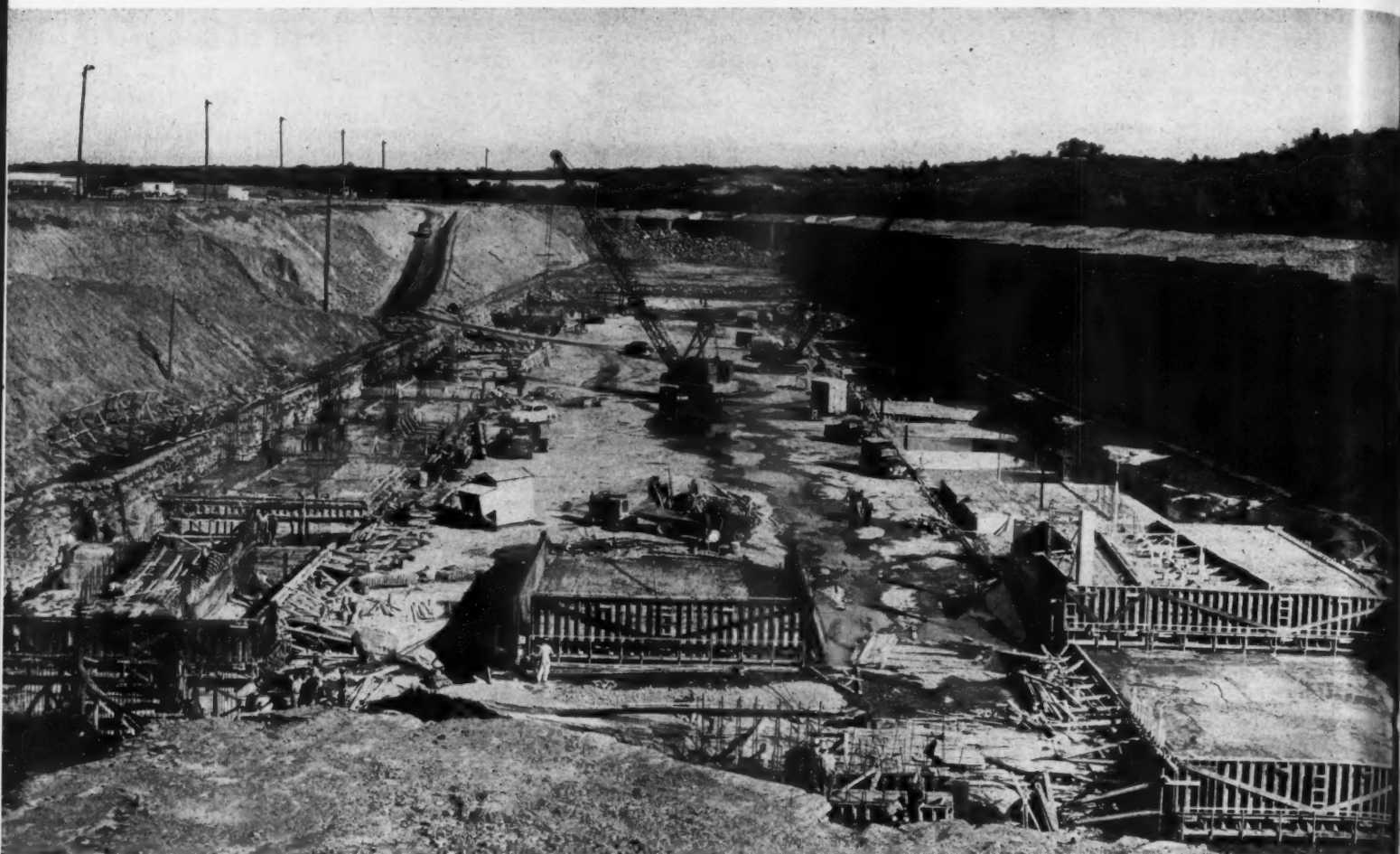
*J Head available as an insert or standard head.

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C. & E. M. Photo

Inside a 36-cell cofferdam on the right bank of the Cumberland River, Cheatham Lock takes shape. The camera faces upstream. That's a Koehring 1005, center, shifting forms.

Cellular Coffers Confines River

• **MAKING** a site available to begin work is sometimes the most important part of a construction project. When a river as big as the Cumberland coursed along where the U. S. Army Corps of Engineers decided to put the new Cheatham Lock, a cofferdam of adequate size and strength was required to turn the water away from the right bank so that the structure might be built on dry ground.

Confronted with this problem, the contractors put in a cellular sheet-pile cofferdam, 2,152 feet long, which included 36 cells having diameters of 52.62 feet. These cylindrical cells were connected by short arcs, also of steel sheet piling. Carnegie-Illinois M-112 sheeting, totaling 3,700 tons, was driven for the cofferdam—48-foot lengths along the river, and 40-foot lengths on the land side. A cell was driven in the average time of only 12 hours.

This good rate of speed was attributed to the portable pile-driving template that was designed especially for the job. The 16-inch steel-sheet sections, 30.7 pounds per linear foot, were held to a true vertical by the template, which was 2 inches less in diameter than the cells and 14 feet high. Built of 2½-inch steel tubing welded into a framework, the template was supported on 6 spuds that went down into the river bottom. Holes were drilled along the spuds on 6-inch centers, so that the two rings that kept the sheeting plumb could be quickly leveled. Top and bottom rings were 14 feet apart. Although rigid in construction, the template was still light enough to be easily picked up as soon as one cell was finished, and moved along for use in driving the next one.

Cheatham Lock and Dam

Sponsored by the Corps of Engineers, Nashville, Tenn., District, Cheatham Lock and Dam

Its 2,152-Foot Length Includes 36 Sheet-Pile Cells Built With Portable Pile-Driving Template; for Lock Construction

ham Lock is being built under a joint-venture \$5,000,000 contract by T. L. James & Co., Inc., of Ruston, La., and Stevens Bros. and The Miller-Hutchinson Co. of New Orleans, La. Construction on the lock got under way in April, 1950, and is scheduled for completion this November. The lock is expected to be open for navigation a few months before that, while the finishing touches are still being put to the contract, which includes such features as an operation building, esplanade, access road, and the handling and installation of Government-furnished equipment.

Located in Cheatham County, Tenn., on the right bank of the Cumberland River, the lock is about 150 miles above the confluence of the Cumberland and Ohio Rivers at Smithland, Ky. It is 10 miles from Ashland City and 25 miles northwest of Nashville. The nearest highway, State Route 12, is 5 miles away, but the Tennessee Central railroad passes close to the site as it follows the river at that point.

The lock is only part of the over-all project, which includes a concrete dam to be built across the river under a subsequent contract. Total estimated cost of the entire works is \$14,000,000. The lock will provide passage for river traffic during the construction of the dam. When completed, Cheatham Lock and Dam will eliminate three older and smaller locks that have 52 x 250-foot chambers. These are identified as Lock A, 2 miles above the new site; Lock 1, about 40 miles upstream; and Lock 2, approximately 54 miles upstream.

New Lock

Built of concrete, the new lock has a

By WILLIAM H. QUIRK,
Eastern Editor

110 x 800-foot chamber, with a 2,538-foot land wall and a 1,493-foot river wall. Normal lift is 30 feet. At the bottom of the main lock chamber the walls are 35 feet thick, but taper back on a 1-to-1 slope for part of the height to a 10-foot width at the top. Beyond the lock chamber the walls are 20 feet wide at the bottom and 8 feet wide at the top.

Lock walls have an average height of 57 feet with their top at elevation 392. There is no slab in the chamber, but about 4 feet of top rock was removed down to a solid stratum at elevation 338 for the lock floor. The upper guard sill is at elevation 367, and the lower is 342, while the minimum depth over the upper sill is 15 feet, and 13 feet over the lower sill. Pool elevations are 385 for the upper and 355 for the lower.

The dam that will be built later across the river from the center line of the upper gate will be approximately 1,000 feet long. It will have a 480-foot spillway section 78 feet in width. A contract for its construction has been awarded by the Corps of Engineers to the Dravo Corp. of Pittsburgh, Pa., on a low bid of \$3,086,414.

The Cofferdam

The James-Stevens-Miller-Hutchinson contractor team built its long cellular sheet-pile cofferdam, starting from the upstream end and working downstream. Of the 36 cells, 28 are in a straight line, with 4 at each end tying back to the river bank in a right-angle turn. The cofferdam encloses the en-

tire river wall of the lock, but the longer land wall extends through it at each end. Special diaphragms were built between two of the cells on the upstream and downstream sides to make room for the wall to go through. Earth dikes were also thrown up at the ends to protect the portions of the land wall extending beyond the cofferdam.

Pile driving started with land rigs, and as the work progressed out into the river a floating rig was added. Finally the land rig could reach no farther, and the cofferdam was completed with two floating rigs. At the start, two shifts were working on the cells, but when the steel sheeting became increasingly difficult to obtain, one shift was knocked off and the cofferdam was completed with the one shift. The top of the structure is at elevation 391 which allowed enough freeboard even when the river did rise to elevation 384 in January, 1951. Cells were backfilled to the top with free-draining material, but two of them had layers of sandbags at the top which could easily be moved if it became necessary to flood the cofferdam should a super-flood occur and threaten the structure.

Driving from the land was done with a Koehring 1005 crawler crane, while the river work was handled with a pair of skid derricks mounted on barges. All machines had 100-foot booms and used McKiernan-Terry 9-B-3 hammers for driving the sheeting.

The special portable steel template that simplified the cofferdam construction was designed by General Superintendent James E. Walters. It is similar to the type of template he introduced several years ago during the construction of the Pickwick Land-

(Continued on next page)

ing Dam on the Tennessee River for the Tennessee Valley Authority.

Excavation and Drainage

Excavation for the lock totaled 843,000 cubic yards, of which 53,300 yards was rock. Two Koehring, a 905 and an 803, did the bulk of the digging, while the material was moved with trucks and Euclids, with a few scraper units working on the short dirt hauls. Most of the excavation was wasted, but about 70,000 yards is required for backfill along the land wall. The material at the site is chiefly sand and silt overlying a rock stratum. The cell sheeting penetrated this overburden, and was driven into a layer of sand that covered the rock.

About 6 to 7 feet of rock was removed in places inside the cofferdam to reach the required grade. Blast holes were drilled by 5 Ingersoll-Rand wagon drills and charged with Hercules dynamite, both 40 and 60 per cent strength. The various compressed-air needs for the job—drilling, vibrators, batch plant, concrete cutback, and so on—were supplied by a pair of Ingersoll-Rand 1,250-cfm compressors, each driven by a General Electric 225-hp synchronous motor.

A channel was dug along each side of the interior of the cofferdam to take care of the drainage. Water was collected in a sump at the downstream end, and pumped over the wall by two Jaeger 10-inch pumps. They were placed on timber platforms, and the sump hole was screened off to keep trash and litter away from the intake hose. Smaller pumps were scattered about the cofferdam to direct water into the drainage channels.

No power lines passed this rather isolated construction site, the nearest utility being on the opposite side of the river, and the contractor was not able to persuade the power company to make the crossing. So he set up two Caterpillar diesel-electric generator sets and made his own electricity for job needs. One unit, a D397, had a 279-kw generator, while the other set, a D386, was hooked to a 250-kw generator, both General Electric. Lights were strung along the river bank overhanging the cofferdam, while other lines for light and power went down into the hole or to the shops and the concrete-batching and mixing plant.

Concrete Plant

During the 1950-1951 winter, a concrete-batching and mixing plant was set up on the high bank beyond the cofferdam, and the first bucket of concrete was placed on April 13 in one of the land-wall sections. The plant is a C. S. Johnson completely automatic unit that was used on the Chain of Rocks Lock in the Mississippi River near St. Louis. At the top of the tower is a 600-ton 5-compartment aggregate bin, and a 500-barrel cement bin. On the level below are three Koehring 3-yard tilting mixers where batches are mixed for 2 minutes and 5 seconds by the clock.

A spur track 2,500 feet long was laid in to the plant from the Tennessee Central railroad, and over this line Hermitage bulk cement is delivered from Nashville, Tenn. It is transferred from the cars to a 2,700-barrel silo alongside the track by a Robinson air-activated unloading system, and piped up to the plant through a 4-inch line

carried alongside the aggregate conveyor.

Aggregate for the mix, in five sizes including sand, is supplied by Lambert Bros. of Knoxville, Tenn., which obtains the material from a limestone quarry only 3,000 feet from the plant. Trucks deliver the sand and stone to stockpiles separated by wooden barriers and located over a recovery tunnel consisting of Armco 8-foot-diameter corrugated-metal pipe, 365 feet long.

Through the tunnel runs a Barber-Greene 30-inch conveyor belt on which the aggregate is discharged, one size at a time, through ports in the tunnel roof. After leaving the tunnel, the conveyor continues up an incline 300 feet farther to the top of the plant where the aggregate is fed into the proper bins.

The Mix

Two wells supply water for the mix, and also for curing the concrete; a 2-inch water line goes up the conveyor trestle to the plant. A York refrigerator system is used to reduce the temperature of the mixing water to around 35 degrees F, and thus prevent the generation of extreme heat in the large mass pours.

The dry weights of a typical batch of concrete used around the tunnel section of the wall are as follows:

Cement	1,410 lbs.
Sand	2,667 lbs.
Stone, 3/4-inch	2,074 lbs.
Stone, 1 1/2-inch	2,271 lbs.
Stone, 3-inch	2,864 lbs.
Water	730 lbs.
Total	12,016 lbs.

To this 3-yard batch there is also added at the mixer 1 pound 6 ounces of

Protex air-entraining agent. A 1-yard batch of grout for use on top of the rock in the lowest lift contains 2,171 pounds of sand and 1,046 pounds of cement.

In the portions of the wall around the gates, tunnels, and operating building, the concrete is reinforced with steel rods supplied by the Laclede Steel Co. of St. Louis. The other parts of the walls are mostly mass concrete without reinforcing, but containing 6-inch aggregate which was not used in the areas that were reinforced.

Wooden Forms

Semicantilever wooden forms are used in the construction of the lock walls. These were also designed by General Superintendent Walters, and are a modified version of the type he introduced on Hiwassee Dam, another TVA project. Panels are built in the carpenter shop in lengths ranging from 11 up to 36 feet, the latter being for the maximum 35-foot width of wall at the bottom of the gate sections. In the lock chamber the walls are built in monoliths 28 feet long, while outside the chamber the monoliths measure 30 feet. Concrete is placed in 5-foot lifts.

Panels are made up on 1 1/4-inch sheathing backed by 3 x 8 vertical studs on 16-inch centers. In the forms for vertical faces the sheathing is 6 feet high and the studs are 8 feet long, extending 2 feet below the bottom of the sheathing. For the inclined 1 to 1 back faces of the walls, sheathing and studs are 8 and 10 feet long respectively to accommodate the placing of a 5-foot lift. Across the top of the panel is an

(Continued on next page)

C. & E. M. Photos



Along a railroad spur track beyond the coffer we see the aggregate stockpiles, the cement silo, and the pipes that carry cement over to the conveyor and up alongside it.



At the top of the conveyor the concrete materials feed into the bins of a C. S. Johnson automatic plant that was used also on the Chain of Rocks Lock in the Mississippi River.



At the mixing tower at the plant, concrete batches discharge into Blaw-Knox 3-yard vertical-side air-operated buckets carried on a Phelan Low Boy machinery trailer....



Beyond the plant, back in the cofferdam, forms are set for a pour. Cheatham Lock, though scheduled for completion in November, will be open for navigation earlier.

Coffer Confines River For Lock Construction

(Continued from preceding page)

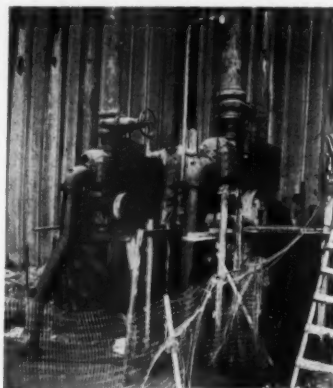
8-inch channel serving as a wale, with a 12-inch channel wale at the bottom, outside the studs and at a level with the bottom of the sheathing.

Beneath the lower channel is a 3 x 12 "false wale" or dummy. Between these two lower wales, Richmond 1-inch anchor bolts are spaced on 9-foot centers to screw into Richmond Ty-Loops that are embedded in the concrete. Along the top of the panel, on 6-foot centers, are 3/4-inch bolts that go through the forms and down into the concrete on a 45-degree angle where they are secured with other Ty-Loops. This hardware securely holds the panels in position while a lift of concrete is being placed. Other holes are made in the concrete 6 inches below the top of a lift. Then when the 1-inch bolts are removed, the panel is raised and anchored with the bolts in the new holes. The Ty-Loops of course remain in the concrete.

Form panels are made mostly of pine in the contractor's carpenter shop, which is equipped with a DeWalt 20-inch-blade table saw, and are used over and over again. Safety scaffolds with guardrails are built around the base of the panels. These walkways are used by the men when erecting the forms and bolting them in place. Forms are raised, lift to lift, by crawler cranes.

Concrete Placing

Concrete batches are discharged from the mixing tower at the plant into Blaw-Knox 2-yard vertical-side air-



C. & E. M. Photo

Two Jaeger 10-inch pumps unwater a sump inside the cofferdam. The screen keeps trash away from the intake hose.

operated bottom-dump buckets. Three such buckets are carried on Phelan Low Boy machinery trailers pulled by Ford F8 trucks. Four truck-trailer

units are on the job for transporting the concrete to the forms. Ramps built at both ends of the cofferdam provide access.

At the forms the buckets are handled by the Koehring 1005 and 803 cranes equipped with 90-foot booms. As the concrete is placed it is vibrated with Chicago Pneumatic 518 two-man vibrators. Curing is done with water. A lapse of five days is required between the placing of successive 5-foot lifts. The surface of a lift is always "cut back" with air-water jets before concrete is placed in the next lift.

Quantities and Personnel

The major items in the contract for the construction of Cheatham Lock include:

Excavation, common	790,000 cu. yds.
Excavation, rock	33,300 cu. yds.
Compacted fill	68,000 cu. yds.
Rock fill	5,000 cu. yds.
Sand and gravel filter	12,000 cu. yds.
Dumped riprap	21,400 cu. yds.
Concrete, lock walls	163,000 cu. yds.
Concrete, miscellaneous	950 cu. yds.
Cement	180,000 bbl.
Reinforcing steel	562,000 lbs.
Wall armor, structural	880,000 lbs.



C. & E. M. Photo

J. E. Walters, left, is General Superintendent for Jones-Stevens-Miller-Hutchinson. Frank L. Bloodworth was Office Engineer for the Corps of Engineers when this photo was taken.

The joint-venture contractors—T. L. (Concluded on next page)

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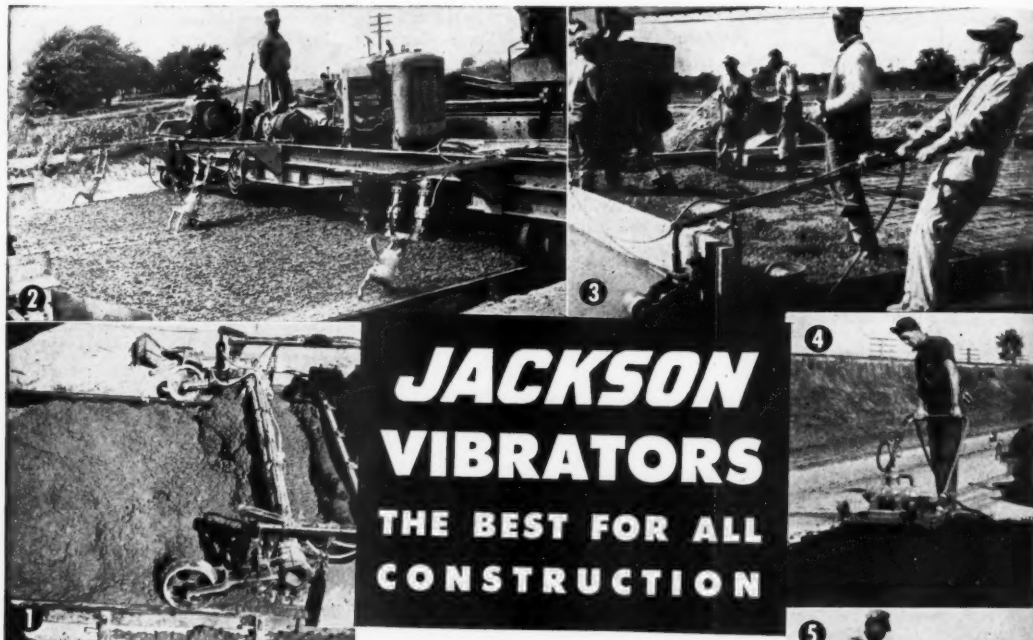
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- VIBRATORY COMPACTOR — GRANULAR SOILS:** Same as above except for corrugated base. Provides 95 to 100% of maximum density (A.A.S.H.O., T99-38, Cone, Vibratory Table).
- FLEXIBLE-SHAFT, ELECTRIC VIBRATOR:** 2 1/2 HP motor. Operates from light socket, 115 V., single phase AC or DC, with any length of shaft up to 28'. 8,000 to 10,000 VPM.
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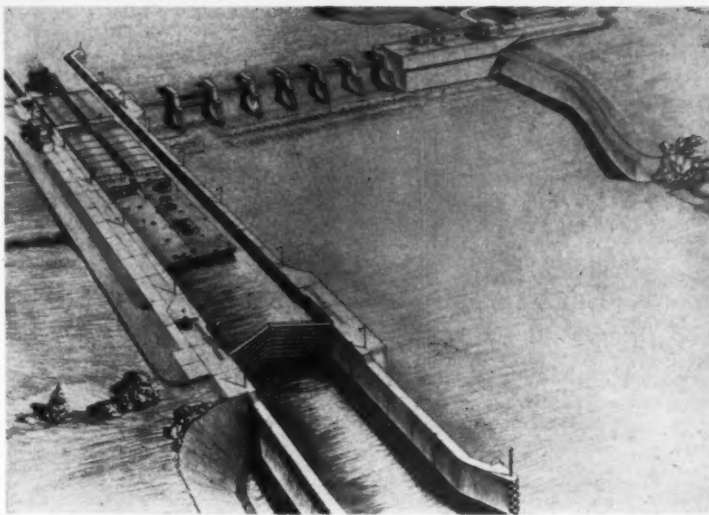
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James & Co., Inc., and Stevens Bros. and The Miller-Hutchinson Co.—have employed an average force of 175 working a single shift. Key personnel include: R. C. Hutchinson, Project Manager; James E. Walters, General Superintendent; Buck Campbell, Chief Engineer; and C. L. Sloan, Field Engineer.

For the U. S. Army Corps of Engineers, Leo C. Wilsbacher is Resident Engineer, Wayman M. Jones is Office Engineer, and Rex V. Hays is Construction Engineer. The Nashville District is headed by Col. Henry Walsh, District Engineer.

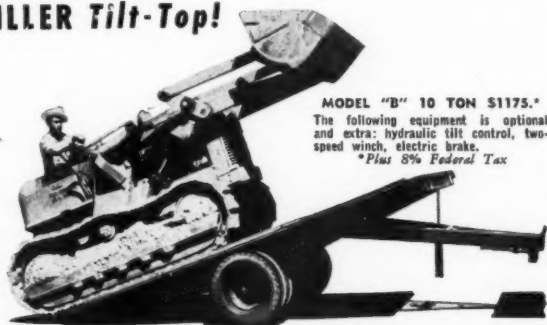
Le Roi Rock-Drill Personnel

Jack Feucht is the newly appointed Chief Engineer of the Cleveland Rock Drill Division of Le Roi Co., Cleveland, Ohio, and Theodore Schmidt is Assistant Chief Engineer. Mr. Feucht joined the company 11 years ago, and for some years prior to his present appointment he had been Develop-



Corps of Engineers, Nashville District, Photo
How the artist sees Cheatham Project on the Cumberland River in Tennessee: the lock on the right bank and the dam still to be built across the river.

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ment Engineer. Mr. Schmidt has been closely associated with him in the development of many Le Roi-Cleveland products.

Waterproofing Seal

A waterproofing seal which protects wires, parts, and batteries is available in a 12-ounce spray container from Reynolds Industries, Inc., 4500 Euclid Ave., Cleveland 3, Ohio.

A hard flexible coating of Sherolite is said to prevent sparks from shorting across the exposed porcelain of a spark plug and the brass terminals. It can also be used to seal leaks around windshields, protect exposed metal from rust, and eliminate electrical leakage.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 242.

A Line of Wheelbarrows

A catalog on its line of wheelbarrows is issued by General Wheelbarrow Co., 700 E. 10th St., Wichita, Kans. It describes the main features which include the rocker dump design, high legs, curved board rest, and steel or grooved hardwood handles. The 16-gage welded-steel trays are deep, narrow, and proof against concrete leakage. Several models have interchangeable parts. Rubber handle grips are available with

the steel handles.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 244.

Brochure on Traffic Signs

A brochure on traffic signs is available from Eastern Metal of Elmira, Inc., 121 Harrison St., Elmira Heights, N. Y. Entitled "Safety on the Highway", it features an A-type stand which can be ordered in 24 and 38-inch sizes. The A-shape is designed to resist wind and hold two flags at 45-degree angles.

All Eastern Metal signs are made in compliance with official American Standards Association specifications and lettered according to the recommendations of the U. S. Department of Commerce and states' official uniform designs.

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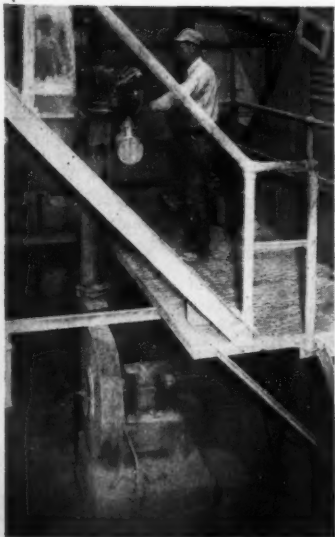
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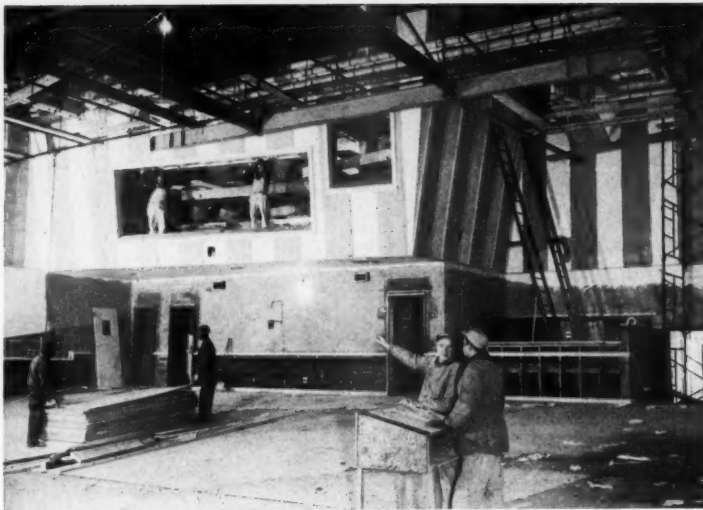


Give To Conquer Cancer

TV and Radio Center Uses Welded Trusses

WCAU's new 100,000-square-foot radio and television center in Philadelphia is nearing completion. The Austin Co., Cleveland, Ohio, is the designer and builder, and the structure is among the first in the United States to be erected exclusively for television and radio.

An interesting feature of the building is the use of Austin's Tele-trusses in the single-story studio area, which extends the full length of one side. These special 60-foot welded trusses do not have the usual diagonals and thus provide greater flexibility in the installation of overhead facilities and equipment. The ceilings for all the TV studios (three large and six smaller) are completely covered by Banacoustic rock-wool insulation covered by fire-proof muslin and held in shape by wire mesh. The walls are covered with 2-foot-wide vertical strips of acoustic blanket 2 feet apart, a blanket strip on



Workmen put finishing touches to the 230-seat audience-participation TV studio at WCAU's new Philadelphia TV and radio center. The Austin Co. built the studios, using its special Tele-trusses without diagonals for the framing.

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one wall being directly opposite a void on the other wall. Of the three large TV studios (60 feet x 80 feet), one is equipped with 230 fixed seats for audience participation. All have a clear height of 20 feet, with elevated control rooms and catwalks which give easy access between the studios and the staging areas.

A three-story structure flanks the studio area. This contains service facilities on the lower level, operating facilities including the client's booth on the studio floor, and studio control room and announcer's booth above the studio floor.

The new building is at City Avenue and Monument Road, Philadelphia, and is located on a 10-acre plot, which will permit of trebling the present studio facilities if and when necessary.

Heavy-Duty Lubricant

A heavy-duty gun grease resistant to water and extreme temperatures has been developed by D-A Lubricant Co., Inc., 1331 W. 29th St., Indianapolis, Ind. The lithium-base lubricant has a high melting point and is said to provide tenacity to metal under the hottest operating conditions. It is said to be equally effective in summer or winter for all pressure fittings and bearings. It will not harden in bearings or separate in storage. It is packaged in 400 and 100-pound drums and 35-pound pails.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 169.

Noncorrosive Plastic Pipe

A range of noncorrosive flexible and rigid plastic pipe is covered in a booklet prepared by The Plastex Pipe & Extrusion Co., 402 Mt. Vernon Ave., Columbus 3, Ohio. Plastex R is a rigid pipe made in sizes from 1/2 inch to 6 inches and used on fresh-water or waste lines. For jet pump connections, the flexible Plastex W is used without damage from freezing or heat. Plastex M in diameters up to 6 inches is recommended by the company for handling corrosive sewage or water not intended for consumption. A complete line of plastic fittings and adapters is also available.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 111.

FOUNDATION CONSTRUCTION

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Truck-Mix Concrete For Widening Strip

Handled by Crane and Bucket. It Adds 9½-Foot Lane to Each Side of Existing Pavement on Philadelphia Pike

• CENTRAL-MIX concrete, a 1-yard bucket, and a crane for handling were recently used to advantage in the laying of a plain-concrete base course for a pavement-widening project near Wilmington, Del. The job consisted of reconstructing a 2.32-mile stretch of U. S. 13, the Philadelphia Pike. It was done by Olivere Paving & Construction Co. of Wilmington under a \$430,000 contract with the Delaware State Highway Department. Work got under way in May, 1951, and was completed by the end of the year.

Located in New Castle County, the job starts within the city at 33rd and Market Streets, runs northeast on Market Street for four blocks to the city line, and continues on the Philadelphia Pike to Bellevue Road. From that point to the Pennsylvania line, U. S. 13 had been improved under previous contracts. The lower third of the project, which is in the built-up Penn Rose district of Wilmington, was not widened, but the 40-foot pavement was resurfaced and the concrete curbs and sidewalks were replaced.

For the northerly two-thirds of the improvement, an 80-foot right-of-way was made available for widening the existing pavement from 40 to 59 feet. The 9-foot 6-inch widening strip on each side is flanked by a new poured-in-place concrete curb that is 6 inches higher than the finished pavement. Behind the curb line is a concrete sidewalk, 5 feet in width x either 4 or 6 inches in thickness.

Old Brick Pavement

For the most part the existing pavement consisted of a 4-inch brick wearing course laid in a 1-inch sand-cement 1:3 mortar that was spread over a concrete base 6 or 8 inches in thickness. In places where some old trolley tracks had been removed from the center of the street, the gaps had been filled in with concrete. Before the widening started, the old pavement, either brick or concrete, was first patched so as to present a smooth top for the bituminous resurfacing. This preliminary work was done by John Julian of Wilmington under a subcontract; he also handled the curbing item.

The City of Wilmington and Levy Court of New Castle County also participated in the project to the extent of constructing a new catch basin and

manhole, and raising the grade of 13 catch basins and 26 manholes that were located within the paved area. While excavation for the widening was small in actual yardage, the work was complicated by the number and variety of underground utilities that had been installed in trenches at the sides of the pavement. Ducts and pipes carried lines for water, sewer, gas, electric, telephone, police, and fire-alarm facilities.

Before the concrete base was laid, (Continued on next page)

Make
this
in
30
seconds



4" to 10" in 30 seconds
12" to 18" in 45 seconds
21" to 27" in 60 seconds
30" to 36" in 90 seconds

MODEL "T" 4" to 36" MODEL "R" 4" to 18"
MODEL "D" Drain Tile — 4" to 16"

McCracken Machines make 4" to 36" concrete pipe, plain or steel reinforced, with either Butt, Tongue & Groove or Bell & Spigot joints—used for Farm Drainage, Road Culverts, and Sewers (both sanitary and storm). McCracken's unmatched production speed, quality of pipe, and economy of operation gives you a big edge over competition and means bigger profits on every job—FOR COMPLETE DETAILS write Dept. CEJ at any of the following addresses:

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CONCRETE PIPE MACHINERY CO.
SIOUX CITY, IOWA

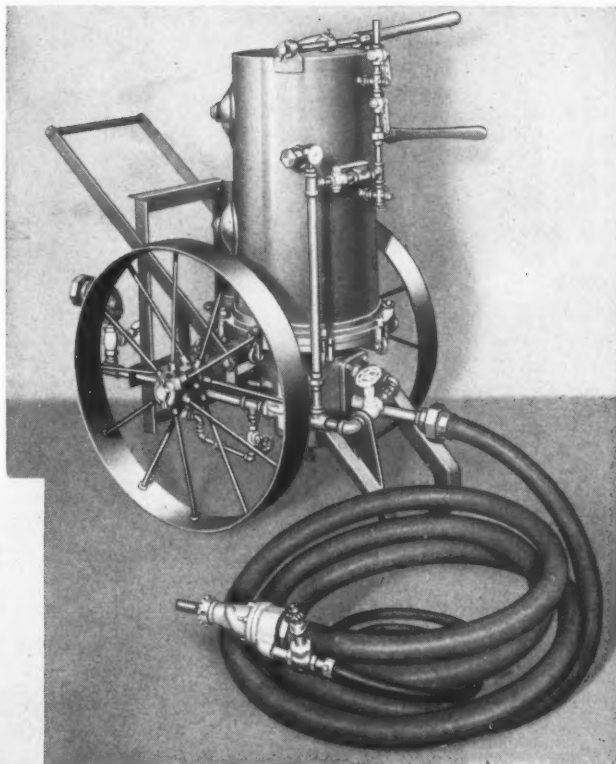
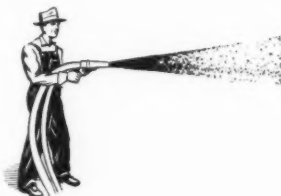
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For Cement Work YOU CAN DO A BETTER JOB WITH A MACRETE Gun

In comparison with hand application on cement work, the MACRETE GUN is not only faster and more economical but gives a higher quality coating. Tensile strength will range from 10% to 200% better than hand work, and compression strength is even more marked—up to 700% greater, and with less voids. Adhesion is increased at least 25%. The MACRETE GUN comes complete with all fittings and accessories—ready to use.



The MACRETE GUN is easy to clean and to keep clean. The unit opens up and tilts back to enable the operator to remove mixture, and prevent hardening or clogging.



The Macrete Gun provides a quick and effective method for re-surfacing old and deteriorated walls.



Ideal for repairing and restoring piers, bridges, etc.



The more difficult the job the easier it is to do with a MACRETE GUN.



For prices and descriptive literature write



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© E. M. Photo

A tar-paper contraction joint is inserted across the concrete base strip by a steel cutter equipped with plow handles at each end.

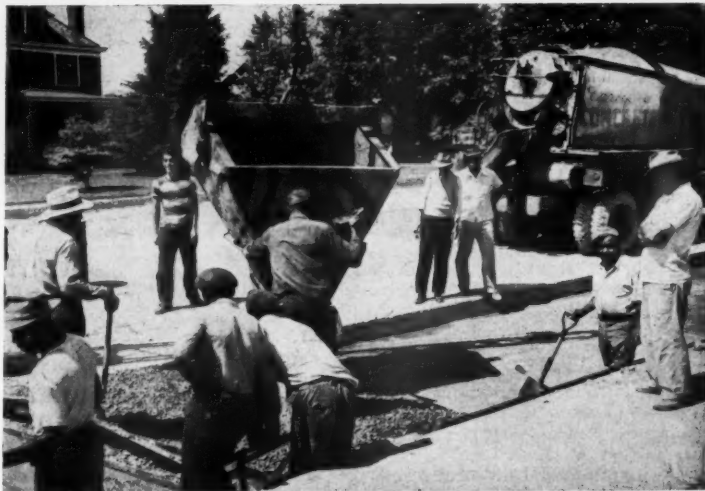
Truck-Mix Concrete For Widening Strip

(Continued from preceding page)

the subgrade was first covered with quarry screenings in a lift 6 to 8 inches thick. The material for this foundation course was obtained from the Glen Mills Quarry at Glen Mills, Pa., 18 miles from the job site. It was delivered in trucks and spread by an Allis-Chalmers tractor-dozzer. The screenings were compacted by a Buffalo-Springfield 3-wheel 6-ton roller, and given a final shaping by an Adams motor grader.

New Pavement

Central-mix concrete for the base course was furnished by Petrillo Bros., Inc., of Wilmington, and delivered to the project in Jaeger 5 or 6-yard truck mixers. Heltzel forms, of which there were 800 linear feet on the job, were laid on the outside of the widening strip just off the old curb line. The



C. & E. M. Photo

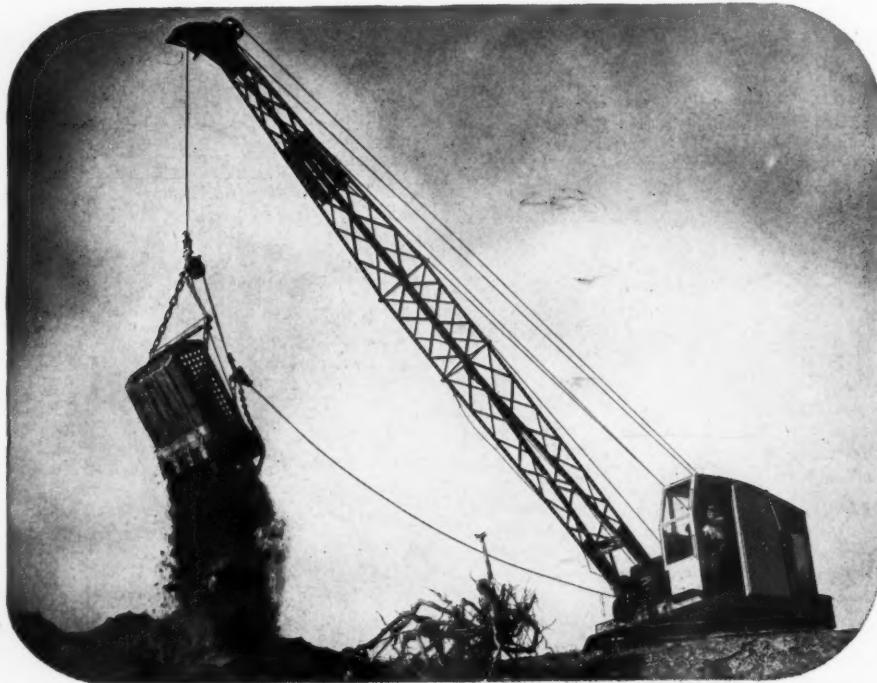
An Insley 1-yard bucket discharges concrete for the base of a widening lane on the Philadelphia Pike. In the background is the Jaeger 6-yard truck mixer which transported the concrete for the job.

existing pavement served as a form on the other side. Before any paving was done, the screenings were wet down from a 750-gallon tank truck. The water was obtained from city hydrants, and sprayed on with a hose under pressure from a Gorman-Rupp 2-inch pump mounted on the rear of the water truck.

From the transit mixers the concrete was discharged into an Insley 1-yard laydown bucket, which was picked up by a Northwest crawler crane, equipped with a 30-foot boom, and emptied between the form and existing pavement. Two steel hand screeds, 12 feet long, were used to level off the concrete. Between the first and second screeds a tar-paper contraction joint was inserted across the concrete base strip on 15-foot centers.

(Concluded on next page)

WIRE ROPE



**This is the most economical rope
we've ever made for construction equipment**

ROEBLING is the best known name in wire rope. That's partly because we were the first wire rope maker in America. But more than that, we've always led in developing better wire and better rope for every purpose.

Today's Roebling Preformed "Blue Center" Steel Wire Rope is the best choice for efficiency and long life on excavating and construction equip-

ment. This rope has extra resistance to crushing and abrasion . . . stands up under rough going. It saves you time and cuts costs.

There's a Roebling wire rope of the right specification for top service on any job. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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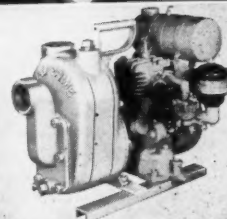
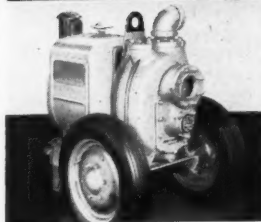
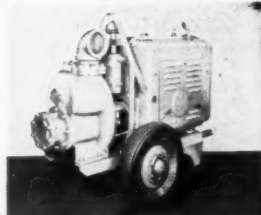
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FREDONIA AVE. • CLEVELAND, 701 ST. CLAIR AVE. N. E.
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19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST.
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ters. A 10-inch width of paper, 9½ feet long, was folded in two lengthwise and laid across the top of the concrete. A steel cutter, with plow handles for a man at each end, forced the paper down into the concrete far enough for the top of the joint to be flush with the surface of the slab.

The concrete was smoothed off with wooden hand floats, and given a burlap-drag finish; any irregularities were checked with a long-handle straight-edge. The surface of the base course was scored with a steel-bristle broom, pulled transversely across the pavement, so as to make a good bond with the blacktop pavement. Curing was done with wet burlap, the water being sprayed on from the tank truck. The sides of the slabs were edged but not the joints.

Alongside the existing pavement the concrete base course is 9 inches thick, but decreases in depth to 7 inches at the curb. With a crew of 16 the contractor placed an average of 100 cubic yards of concrete in an 8-hour day.

Blacktop Surfacing

Asphaltic concrete was laid full width over both the old pavement and the new concrete base course. Material was obtained from a commercial asphalt plant at Glen Mills, Pa., and delivered to the job by truck where it was laid in 12-foot average-width lanes by a Barber-Greene Finisher, and compacted by 10-ton tandem rollers. The blacktop pavement has a total thickness of 4 inches consisting of a 2½-inch binder course and a 1½-inch surface course.

Gradation requirements for the binder and surface courses, according to state specifications, were as follows:

Sieve Size	Per Cent Passing Binder	Per Cent Passing Surface
1½-inch	100	....
1-inch	95-100	....
¾-inch	95-100	100
½-inch	....	80-100
No. 4	25-45	50-65
No. 10	....	30-45
No. 20	....	20-30
No. 40	....	15-25
No. 80	....	10-25
No. 200	5-10	5-10
Bitumen	4½-7	6-8

Quantities and Personnel

The major items in the 2.32-mile highway improvement contract included the following:

Excavation	12,500 cu. yds.
Cement-concrete base	4,500 cu. yds.
Compacted quarry screenings	9,000 tons
Hot-mix asphaltic concrete	19,000 tons
Cement-concrete sidewalk, 4-inch	61,500 sq. ft.
Cement-concrete sidewalk, 6-inch	8,000 sq. ft.
Cement-concrete curb	22,000 lin. ft.

For the Olivere Paving & Construction Co., Louis Corrozi was Superintendent.

The Delaware State Highway Department was represented by Don Pileggi, Project Engineer, assisted by V. Talmo and Francis F. Conway, Inspectors. John I. Callahan is Division Engineer for the area in which this project was located. The Department is headed by Richard A. Haber, Chief Engineer.

Information on Shore Clamps

A system of lightweight shore clamps is illustrated in a booklet available from Farmers Tool & Supply Corp., 4615 Washington, Denver 16, Colo. The E-Z clamps can be used on 2 x 4 or 4 x 4 lumber from 2 feet on up.

Shores are composed of an upper and a lower post held together by two clamps. Each clamp is made of two shoes tied together with metal arms. The upper post is set in the loose clamps, lifted to the desired height, and then held by a slight hammer blow on the lower shoe.

The company points out that this system eliminates measuring, cutting, and wedging. The shores support up to 6,000 pounds.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 191.

HRB Reviews Soil-Survey Mapping for Engineering

Highway Research Board Bulletin No. 46, "Engineering Soil Survey Mapping", contains five papers sponsored by the Committee on Surveying and Classifying Soils In-Place for Engineering Purposes, and presented at the 30th Annual Meeting of the Board in 1951. The papers are: (1) "How to Calculate a Calculated Risk", by Donald J. Belcher, Professor, School of Engineering, Cornell University (an engineering appraisal of limestone landforms); (2) "Engineering Significance of Sand Areas Interpreted from Airphotos", by A. Morgan Johnson, Associate Professor of Civil Engineering, Wayne University, Detroit (en-

gineering mapping of glacial landforms in Indiana); (3) "Piedmont Soils Identified by Aerial Photographs", by John C. Stevens, Associate Research Engineer, Virginia Council of Highway Investigation and Research (engineering mapping of deeply weathered soils derived from igneous and metamorphic rocks); (4) "Mapping of Geologic Formations by the Application of Aerial Photography", by William F. Brown, Jr., Research Assistant, Virginia Council of Highway Investigation and Research (geologic mapping of sedimentary parent materials and derived soils); and (5) "Preparation of Soil-Engineering Maps from Agricultural Reports", by Thomas H. Thornburn, Research Assistance Professor in Civil Engineering, University of Illinois, and

J. R. Bissett, Associate Professor of Civil Engineering, University of Arkansas (grouping of agricultural-soil series).

In addition to these papers, the bulletin contains information compiled from the U. S. Geologic Survey; U. S. Department of Agriculture (Division of Soil Survey); and the Soil Conservation Service. Lists of geologists and soil scientists and current geologic and agricultural-survey mapping projects in progress are included for reference, and a descriptive folder issued by the U. S. Geological Survey on topographic maps is included.

HRB Bulletin No. 46 is obtainable from The Highway Research Board, 2101 Constitution Ave., Washington 25, D. C., at a cost of \$1.50.

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10 YEARS!
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GENERAL CONTRACTOR, INC.

Los Angeles 10, California

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The Whiteman Floating-Finishing Machines which we bought 10 years ago are still in use and doing a good job. We have purchased many more of these machines and find them to be highly efficient, dependable and great time and money savers on the job.

Very truly yours,

ROBERT E. MC KEE
GENERAL CONTRACTOR, INC.

By *John P. [Signature]*

LW:tu
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A few Robert E. McKee projects on which Whiteman equipment has been used.

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City _____ Zone _____ State _____



The Drill-Jak mechanical pressure tool is shown maintaining drill alignment. It also does lifting, bracing, pushing, and pulling jobs.

New Pressure Tool

A 9½-pound mechanical pressure tool and universal drill motor clamp for maintaining drill alignment and doing a number of bracing jobs is announced by Equipment Corp. of America, 2103 St. Clair Ave., Cleveland 14, Ohio. The 34½-inch Drill-Jak can exert a force up to 2,000 pounds at lifts

up to 30 inches. Extension pipes with adapters can be used to reach 25 feet.

The mechanical friction-grip action of the tool, like that of a simple lifting jack, forces the drill motor ahead. An instant pressure release works from the lift handle, providing one-hand control. Pressure pads and cleaning attachments are furnished for both pipe and shaft ends.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 195.

Steel Drawer Unit

Announcement of an 18-drawer steel cabinet for holding 3 x 5 cards as well as nuts, bolts, and general hardware, is made by the Equipto Division of Aurora Equipment Co., John and Prairie Sts., Aurora, Ill. The drawers are 5½ inches wide, 3½ inches high, and 17 inches deep. They have two adjustable dividers on 1-inch centers.

The over-all size of the cabinet is 18 inches deep, 14 inches high, and 34



The Equipto steel drawer unit for general hardware is 18 inches deep, 14 inches high, and 34 inches wide.

inches wide. Units may be stacked. Further information may be secured

from the company. Or use the Request Card at page 16. Circle No. 102.

How to Operate a Shaper

A 32-page handbook on "How to Run a Metal Working Shaper" has been issued by South Bend Lathe Works as a guide for setting up and operating its 7-inch bench shaper. Over 65 photos, diagrams, and exploded views show the internal parts of a shaper, how to grind differently formed tool bits for shaper cuts, and how to handle the many job setups used in shaper work.

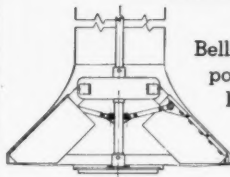
It is written so that the fine points of shaper operation will not go over the beginner's head, yet the experienced operator will find many tricks of the trade and machining short cuts.

This literature may be obtained from South Bend Lathe Works, 114 E. Madison St., South Bend 22, Ind. Each copy costs 25 cents, but vocational directors and school shop instructors will receive free sample copies on request.

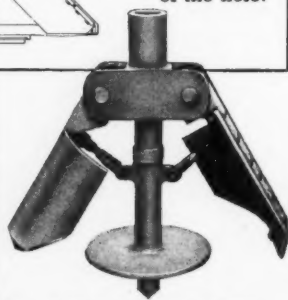
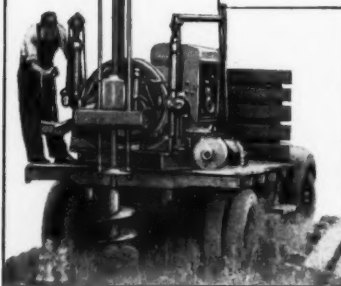
SAVE TIME, LABOR, MATERIAL

**Drill BELLED
PIER HOLES
WITH A BUDA
EARTH DRILL and
BELLING ATTACHMENT**

DRILL FOUNDATION PIERS



Belling tool in cutting position at bottom of hole. Note contour of the hole.



Buda Model HBR Earth Drill. Drills diameters to 52"; Depths to 24 ft.

Cut costs, save material and speed production of foundation or anchor pier holes with a Buda Earth Drill and the new Belling Tool. Quickly attached to the Earth Drill spindle, the Belling Tool enlarges the bottom of a drilled hole to the proper bell shape to provide more bearing surface for positive anchoring of concrete.

Belling action is positively hy-

draulically controlled as the drill spindle is fed down into hole. Excavated material is gathered into the Belling Tool and brought up on the Bottom Plate. Belling Tools are available for bored holes 12" to 42" in diameter; maximum diameter of bell 2 to 2½ times diameter of hole on most sizes. Ask your Buda Earth Drill Distributor for complete details. Write for Bulletins, Specifications, Prices.

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Write for name of your nearby
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The superiority of Permite Concrete Curing Compound has been proven on airfields, flood walls, highways and other great engineering projects. Supplied in three different types to meet the special requirements of all concrete construction jobs.

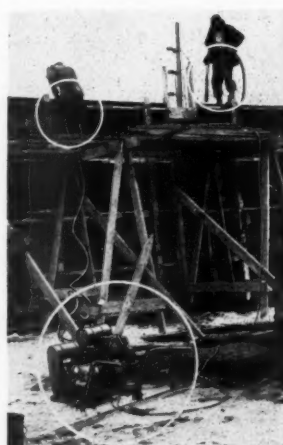
Permite meets or exceeds the specifications of most States and Counties, the Corps of Engineers, U. S. Army, the Department of the Navy, and other Federal Agencies.

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Distributors in Major Cities for Quick Service.

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**IT'S COST SAVING
IT'S TIME SAVING
IT'S AMAZING**

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Maginniss
HI-LECTRIC
CONCRETE VIBRATOR
ONE MAN OPERATION

NO FLEXIBLE SHAFT
HEAD IS LIGHT

In photo—Maginniss HI-LECTRIC Generator with two Vibrators, each with one operator, replaced two gas engine flexible shaft vibrators, each with two operators. The wall is 12' high, 14" thick.

The Maginniss Vibrators and Generators are engineered to give you the most efficient, low-cost handling of concrete placement.

Write today for your free copy of our vibrator and generator catalog.

Maginniss POWER TOOL CO.
MANSFIELD, OHIO



This is the new Berger convertible transit level—part of the N line recently introduced.

Surveying Instruments

A new line of surveying instruments for contractors and builders has been introduced by C. L. Berger & Sons, Inc., 37 Williams St., Boston 19, Mass. Made of brass and bronze, the N line consists of a convertible transit level, a heavy-duty 12-inch dumpy level, a service transit level, and a hand level.

Both the convertible unit and the dumpy level have a 12-inch erecting-internal focusing, hard-bronze telescope, rack and pinion adjustment, 22-power coated optics, and a steel spindle. Verniers read to 5 minutes. Leveling, clamp, and tangent screws are dust-protected.

The service transit level is used for less accurate work. It has a 10-power 10½-inch erecting telescope, rack and pin focusing, cross hairs in fixed focus, and dust-protected bearings. Tripod legs are of one-piece construction with metal shoes.

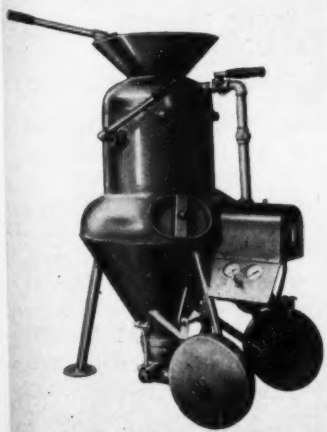
All parts of the hand level are permanently fitted and cannot go out of adjustment, the company claims. The hand level has stabilized internal focusing and an interior permanently mounted level vial. It is fully dust-protected, 6½ inches long, and includes an attached neck cord.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 157.

Air-Placement Unit

A new unit for the air placement of all types of cementitious materials has been developed by Blastcrete Equipment Co., 11152 Santa Monica Blvd., Los Angeles 25, Calif. The operator has complete control of air pressure and material volume, and can make all adjustments while the machine is running.

The agitating and material-metering mechanisms are said to require little air, thus permitting smaller-capacity air compressors. The company claims



The Blastcrete machine for air placement of cementitious materials requires relatively little air and can be used with small-capacity compressors. It comes in three sizes.

that in a matter of a few minutes the operator can switch nozzle liners so that the machine is set to run with a 105, 210, or 315-cfm air compressor. The Blastcrete can be adjusted to deliver from a few cubic feet of material per hour to 4 cubic yards per hour, and in case of lightweight aggregates such as vermiculite, perlite, or pumice, 5 and 6 cubic yards per hour.

The feeding mechanism can handle materials with a very high water content, and material can be sent through the hose at such a constant rate that "dry pockets" are eliminated from the work, the company says.

The Blastcrete may be used for lining ditches, stabilizing banks, repairing concrete structures, waterproofing concrete or masonry structures, etc. It can

be used in the tilt-up method of construction for keying slabs together after they have been put in place, and at the same time gunning steel sash into place.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 128.

Riddell Appoints Whelan

Joseph D. Whelan is a newly appointed district sales representative for W. A. Riddell Corp., Bucyrus, Ohio, manufacturer of hydraulic motor graders. Mr. Whelan will make his headquarters in California and cover the territory of Washington, Oregon, Idaho, Utah, Nevada, California, Arizona, and British Columbia.

Booklet on Diesel Tractor

A 32-page booklet on the Caterpillar D4 explains part-by-part how the tractor is built, and how it performs. The 43-drawbar-hp machine is illustrated.

Cutaway drawings and photos show the workings of both individual parts and whole systems. Special attention is given to fuel-injection valves and pumps, filters, and governors. Long-life features of engine parts, gears, tracks, and rollers are also described. Specifications are listed along with reports from actual D4 owners.

This literature may be obtained from the Caterpillar Tractor Co., Peoria 8, Ill., by requesting Form 30291, or by using the Request Card at page 16. Circle No. 153.

AIR CONTROLS

Air does the work on the "50". Air assist controls hoist, crowd, retract operations—full air control for crawler steering and tread lock operation.

HYDRAULIC COUPLING

No shocks, no engine stall with Lorain Hydraulic (Fluid) Coupling. It's the only 1-yd. machine with Hydraulic Coupling as standard.

CHOICE OF 4 CRAWLERS

Standard, extra-long, extra-wide, wide and long... you can fit the "50" with a crawler to match exactly any ground or working condition.

CENTER DRIVE CONSTRUCTION

Here's direct power—where you want it. Gang-up full engine power in any one operation, or spread power over simultaneous, synchronized operations.

5 INTERCHANGEABLE FRONT ENDS

For complete job versatility, any one of 5 interchangeable front ends can be used on the Lorain-50... shovel, crane clamshell, dragline and hoe.

These 5 reasons are only a few of the many reasons why the Lorain-50 is your best bet in a 1-yard shovel-crane. Throughout the Lorain-50, there is more value, true "Balanced Quality" to give you fast, responsive, dependable performance in any kind of service. You will find more quality features in the "50" than in any other machine in the 1-yard class.

Be sure to obtain full facts on the "50" from your Thew-Lorain Distributor. Compare Lorain "Balanced Quality" in dollar value before you buy.

THE THEW SHOVEL CO.
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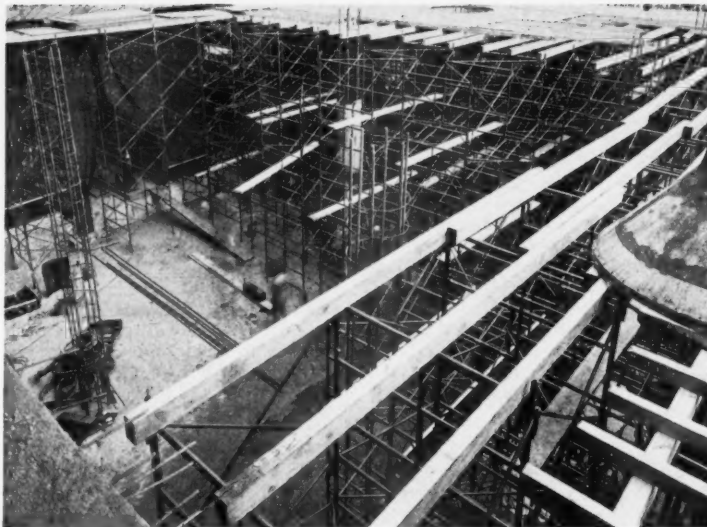
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Panel Scaffolding Lowers Shoring Cost

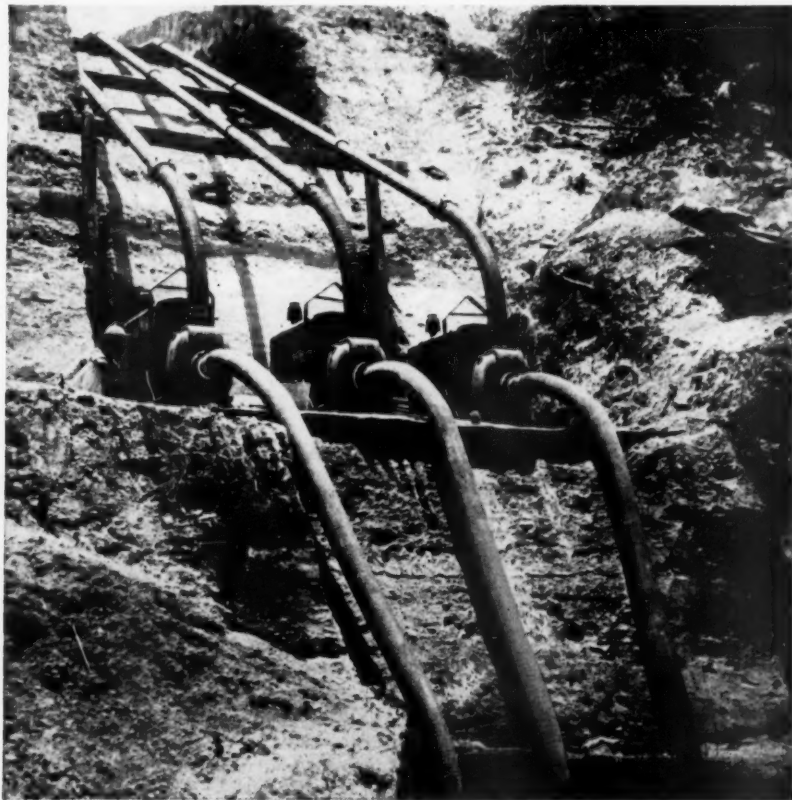
Another use for steel panel scaffolding was found on the new Gateway Center Buildings in Pittsburgh. Two exterior basements 75 feet square and 30 feet high had to be covered with a heavy 23-inch reinforced-concrete slab. Normal shoring would have required a system of two post shores with a deck between to reach the underside of the slab.

Slattery Contracting Co. of New York City and Harrison Construction Co. of Pittsburgh went to Universal Mfg. Co. to design and supervise the erection of Ezebilt steel panel scaffolding for supporting the slab formwork. Ten runs 5 feet wide, 23½ feet high, and 75 feet long were spaced 26 inches apart and supported on adjustable bases.

The design reduced the amount of wood used to 4x6 sills on 18-inch centers resting directly on the scaffolding, 3x4 joists on 18-inch centers, and ¾-inch plywood. The scaffold carried



Here, about half completed, is the Ezebilt scaffold shoring used to support forms for a 23-inch RC slab in a Pittsburgh building.



Taking it on the chin — without grunting or groaning. Here are Barnes Pumps working a really tough job in South America. With overhaul shops hundreds of miles from the job, the contractor had to have pumps that would stay on the job without "time out" for repairs. That's where Barnes Pumps outshine all others.

BARNES "33,000 FOR 1" PUMPS NOT ONLY "TAKE IT" BUT KEEP DISHING IT OUT ON THE TOUGH JOBS!



BUY THE BEST • • • BUY BARNES

Got a tough pumping job? Give it to Barnes Automatic Centrifugals and watch 'em walk off with the load! Watch them "put out" day in and day out — year after year. Watch them pump 33,000 gallons of water on each gallon of gas! Watch how they stand up without overhaul! Then you will see why Barnes Self Primers are first in the minds of construction men who want the best in pumps.

The Barnes Line is complete—with capacities ranging from 4,000 to 90,000 G. P. H. — with choice of either Electric, Diesel, Gasoline, or Pulley Drive.



the forms for the slab, column caps, and 8x17-inch curbs down both sides. The total load of concrete and forms on the scaffolding exceeded 300 pounds per square foot.

The adjustable bases on the scaffold permitted 16½ inches of leveling. After preliminary stripping, the bases lowered the scaffold so that the top sections could be removed. The remaining sections were used as a work platform for stripping forms.

The 23-inch slab and 4 feet of fill on top is supported by 28-inch columns on 25-foot centers. Column caps are 7 feet in diameter and were poured integrally with 3-inch slump concrete. Erection of scaffold shoring and forms took 4 days.

Truck-Mounted Crane

A hydraulically operated truck crane that lifts up to 6,400 pounds with a power-swinging boom is illustrated in a booklet available from Pitman Mfg. Co., 300 W. 79th Terrace, Kansas City, Mo.

The Hydra-Lift fits on the frame of any 1½-ton or larger truck and requires only 40 inches of space behind the cab. The boom swings in a complete 180-degree arc, lifts through an arc of 100 degrees, and telescopes from 12 to 17 to 22 feet.

Power is transferred from the truck motor by means of a power takeoff and two underdrive connections to a hydraulic pump and a winch. The hydraulic pump actuates two cylinders which swing and lift the boom and the winch powers the loadline cable.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 185.

Oven Stores Electrodes

A portable electrically heated oven for storing unpacked coated electrodes is the subject of a folder available from Philip Roden Co., 1721 E. Lake Bluff Blvd., Milwaukee 11, Wis. The DryRod operates automatically off 110-220 or 140 volts. Variable thermostatic control regulates temperatures to protect any type of electrode. The company points out that oven care stops under-bead cracking, X-ray porosity, rough welds, expensive rework, and gives electrodes a more consistent quality.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 183.



OVERMAN'S STONE AND BITUMINOUS SPREADER

DESIGNED AND BUILT BY
A PAVING CONTRACTOR

After years of personal experience in laying asphalt, Mr. Overman saw the need of a lightweight bituminous spreader, primarily to cut the cost of hand labor and time; thus he designed the OVERMAN SPREADER UNIT to lay materials many tons faster per hour and to reduce labor to a minimum.

WRITE FOR BULLETIN

I. J. OVERMAN MFG. CO.
BOX 203 MARION, IND.

How to Keep Down Dust This Summer

Now that summer is upon us again—and summer's dust—the Calcium Chloride Institute has a word or two to say about low-cost dust control on gravel roads.

Moisture control is the key to dust control, of course. Keep enough moisture in a road surface, and you won't have dust. Flake calcium chloride does just that. Spread on the road surface, it helps retain moisture by absorbing it, dissolving itself in it, then spreading out over an area about eight times the size of the original treatment area, and resisting evaporation for a long time. One pound per square yard of surface will usually keep down dust

for several months, the Institute says. The treatment also keeps gravel particles from blowing away, as they do when they're dry, and thus conserves road materials and lowers maintenance costs.

Farmers hate dust as much as motorists do, for it hurts many crops and is generally a nuisance. Spot-treating roads for about 300 feet in front of a farmhouse lays the dust. Farmers often share the cost of this treatment with other farmers and the county; some counties assume the entire cost.

The same goes for homeowners in suburbs which are still waiting for higher-type road surfaces. Often they share the cost of treatment with the local department of public works.

The Institute says calcium chloride

is a boon in resort areas, too. Michigan, Iowa, Tennessee, New York, New Jersey, Vermont, Maine, Maryland, Virginia, and many other states use it to keep resort-area access roads dust-free for tourists and vacationers. It also does duty on playgrounds, tennis courts, bridle paths, in trailer parks, motels, and drive-in theatres.

If you want more information, write to the Calcium Chloride Institute, 909 Ring Bldg., Washington 6, D. C.

Buda Promotes Baseheart

J. C. Baseheart is General Sales Manager of the Engine Division of The Buda Co., Harvey, Ill. In his new position he is responsible for all wholesale and retail sales of Buda engines

and generators. Mr. Baseheart has been associated with the company for 26 years.

Tractor-Mounted Ditcher

A catalog on a ditcher that operates from the rear of Ford or Ferguson tractors is issued by Shawnee Mfg. Co., 1947 N. Topeka Ave., Topeka, Kans. The Scout can dig to depths of 10 feet with 12 to 20-inch buckets. It has a bucket clearance of 10 feet and operates within a 150-degree radius. Large heavy-duty hydraulic cylinders apply a down pressure on the bucket as far as 14 feet behind the main frame.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 162.

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P. L. Crooks & Co., Portland, Oregon.

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Rish Equipment Co., Clarkburg, W. Va.; Charleston 22; East on U.S. 80, Clarkburg; P. O. Box 1, S. Smith, Inc., Philadelphia, Penna.

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(Above) Model TD Rear-Dump Euclid. 22 ton capacity... 14.8 cu. yds. truck... loaded top speed 32.4 m.p.h.... powered by 286 or 300 h.p. diesel engines.

(Below) Double-acting twin hoists and entire hydraulic system are of Euclid design and manufacture. Action is fast and positive enabling operator to control body position at all times.



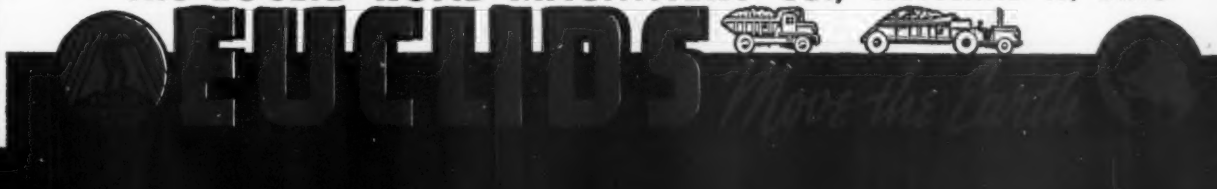
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"Euc" bodies have extra thick plates reinforced with heavy box section side and bottom supports. The rugged frames are built to withstand the impacts of hauling and dumping big loads... they're built to take the pounding and wear of loading earth, rock and other heavy excavation by large shovels and draglines.

Rear-Dump "Eucs" have many other "plus" features that make them standard equipment in mines, quarries and on construction work. For example, they have large capacity, ample power and traction for steep grades... speed on the haul road and full-floating, double-reduction planetary type Euclid axle.

For information on equipment that is job proved on work similar to yours, get in touch with your Euclid Distributor or write direct for literature on the complete line of Euclid models.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO



Proper Welding Can Salvage Track Parts

Material Shortages Make It Wise to Investigate Methods Of Saving Earth-Mover Rollers, Links, and Shoes

• WAYS to extend the life of crawler-type earth-movers during these days of material shortages were detailed at the recent Society of Automotive Engineers Earth-Moving Conference in Peoria, Ill. V. A. Woodling, Manager of Caterpillar's Service Development Division, outlined sections of the parts-conservation program now practiced by Caterpillar dealers. In particular, he emphasized how dealers as well as users can save thousands of tons of steel through proper welding on track links, rollers, and shoes.

Track-Shoe Salvage

Track shoes, he pointed out, are in contact with the ground and thus are subject to varying degrees of wear. They gain their initial strength from their thickness and from the grouser which, in addition to increasing traction, forms a reinforcement to help resist shoe bending under heavy impact.

Wear generally occurs only on the extended grouser. Eventually the grouser becomes so worn that it no longer provides support, and bending occurs about the center area over the track links. Worn grousers also promote wear of other parts by the loss in traction and increase in slippage.

As long as grousers are one inch high on larger machines and $\frac{3}{4}$ inch on smaller, they can be restored quickly by welding with bar stock. Woodling reports that the application requires only average welding skill, that build-up bars are inexpensive, and that the resulting life justifies the cost.

Materials recommended are mill-run medium-carbon-steel bar stock of SAE 1030 to 1050. A number of alloy steels with higher manganese or nickel content have displayed excellent wear resistance. Some steel suppliers also offer pre-cut lug sections for various shoe sizes, which reduce waste and application time. Even round concrete-reinforcing rods can be used if given a wear-resistant surfacing.

Although only average welding skill is required, several precautions must be observed. First, surface imperfections on the grouser such as cracks, rust, and sand must be removed by grinding. Second, both the grouser and applicator should be preheated to about 500 degrees F to prevent cracks. Finally, some small clearance between the bar and the grouser should be left to allow for expansion during application of string beads and for full penetration of the weld.

Low-hydrogen (lime ferretic) electrodes of the AWS E6016 classification are suitable for any bars containing up to 2 per cent manganese. Higher-tensile electrodes such as E7015 may also be used. If applicator bars with high (12 per cent) manganese or manganese-nickel content are selected, stainless-steel electrodes of the 18-8 type are recommended for welding. Application may be made with a single "buttering" pass of the stainless-steel electrode, using high-tensile electrodes (AWS E7016) for the cover passes.

Grousers may be hard-faced for increased resistance to abrasion; the process can be very successful or can result in severe damage to shoes. Success is achieved only if the shoe is properly preheated, a very thin layer of hard-surfacing is applied, and the proper electrode is chosen.

Cracks in shoes have often been directly traced to overlays of hard-facing

material. Investigation usually reveals that surfacing was done on a cold shoe. Preheating to at least 450 or 500 degrees F appears to be essential. Overlays thicker than about $\frac{1}{8}$ inch show an increasing tendency to crack or spall off the grouser, and

the cracks in the weld metal frequently lead to cracking through the grouser and into the shoe. So thin overlays should be used and replaced more often. Many hard-surfacing electrodes display practically no resistance to impact when used on grousers. Mr. Woodling feels that ultimate hardness or abrasion resistance can well be sacrificed in favor of a more rapidly wearing surface which will not crack.

Build-up bars or hard-surfacing overlays can be applied with the tracks intact and on the machine. Suspending the track overhead on some sort of idler permits even faster application. Bars may be attached to two strings of track in something less than 32 man-hours when two welders work together. Working alone, a single welder may

take about 40 hours for the job.

For large tractors, 300 pounds of bar stock and 60 to 70 pounds of electrode will restore shoes to a usable condition. Replacement track shoes for the same machine would require more than one ton of steel.

Experience shows that properly applied grouser bars will offer about one-half the service life of new shoes. Although no figures are available, it is believed that the service life of high-manganese bars is considerably greater. When the first set of bars is worn down to the original prescribed limits, a new set may be attached.

Track-Link Salvage

Track links form the rolling surface
(Continued on next page)

*"On one of the toughest
compaction jobs we've seen -*

THE CEDARAPIDS VIBRATORY

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COMPACTION OF HIGHWAYS . . .

This road was NOT Compacted

It's obvious that there was little or no attempt made to obtain the proper density for the base and sub-base of this road. The less dense a material, the more room there is for water to permeate the soil. The result . . . early structural failure and a costly maintenance and repair job.



A CEDARAPIDS COMPACTOR prepared this road for paving

A good foundation means a good road with a long life expectancy. On this road, vibratory compaction to the proper density has furnished a substantial foundation to assure greater permanent structural strengths in large load bearing capacities. Road maintenance here is materially reduced.



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over which the tractor moves. Link wear may be considered confined to the rail surfaces, as well as to those surfaces contacted by the guiding flanges on the rollers and idlers. Wear rates range from very rapid wear under the abrasive cutting action of water and sand, to very mild wear from normal sliding and rolling contact.

Links on a modern tractor are forged from high-quality medium-carbon steels and the rail surface is induction-hardened to about Rockwell C-60 to a depth of about $\frac{1}{8}$ inch. In their original state, links are quite resistant to wear until the hardened surface ($\frac{1}{8}$ inch) is worn away. Then wear usually accelerates, depending on soils, loads, and speeds of operation. Maximum wear limits are not determined by the

original hardness depth, but primarily by the clearance between the rim flanges of the roller and the extended connecting-pin bosses. When links are so worn that interference exists between the roller flanges and the link bosses, continued operation will only result in the ultimate destruction of the rollers and the links, as well as of other parts of the track frame.

Owners should resurface track links before wear has progressed beyond established limits. The basic link structure then remains strong, and resurfacing is much less expensive. The ideal time for resurfacing is when the original link has worn through its hardened surface.

Link salvage is not difficult, but compared to other salvage operations,

it is time-consuming. Weld overlays have been found to be the best solution. Plates or "half soles" cut to the contour of the link wearing surface are available, but these as applied are not as successful as the use of weld metal alone.

Links are often subject to severe abrasion and impact, as well as to stretching and bending under loads. It is therefore desirable to maintain them as near to full cross section as possible without weakening any section through wear or by welding stresses. During the development of a satisfactory process for applying weld it was felt that the surface should compare favorably with the original wearing surface of the link. After considerable investigation, said Mr. Woodling, it was found

that deposits between C-30 and C-40 appeared to be the best, particularly in cold-weather operation.

Welding electrodes suitable for track-link resurfacing fall into two general classifications: (1) medium and high-carbon, and (2) semiaustenitic, having moderate work-hardening characteristics. Field experience has shown that medium and high-carbon rods are less resistant to abrasion but are superior in resisting impacts and subsequent spalling. The sacrifice of abrasion resistance appears justified in many operations, particularly in rock work. Generally the carbon electrodes are much less expensive, and more readily obtained. Another point in their favor is the fact that the less experienced welder will have better success, since welding temperatures and cooling rates are not critical.

Application follows normal good welding procedures. The links must be cleaned of surface inclusions such as sand or rust. Preheating to 400 or 500 degrees F is always desirable, and, with many semiaustenitic electrodes, necessary. Preheating and buffing apparently remove some of the prior hardened-surface stresses, as better weld bonds are evident.

Edges of the links are first built up with a "dam" of stainless-steel or medium-carbon electrode. This bead forms a tough, tear-resistant edge into which the welder can work his weld overlay. It also gives him a guide to help maintain the required surface height. Welding progresses from each end of the link across the surface, roughly at a 45-degree angle to the length of the link.

Applying more than three layers of surface weld may lead to cracking. Generally track links can be restored to usable heights with two or three layers, an increase of $\frac{1}{4}$ to $\frac{1}{2}$ inch. When the restored surface wears away a new surface can again be applied. Single layers can be quickly applied as soon as the links wear down $\frac{1}{8}$ inch. One record shows several track-link assemblies resurfaced with high-carbon electrode as many as four times before being discarded.

A smooth weld job contributes much to the life of the overlay. Those deposits which work-harden rapidly must be smooth to avoid excessively hard areas which may crack or spall. Furthermore, smooth welds reduce wear on rollers and idlers. As a precautionary measure, semiaustenitic deposits can be ground to remove high spots and thus avoid spalling.

Field experience indicates the average resurfacing job will give the user about one-half the wear life of a new link. Thus, if normal link life is 2,500 hours, resurfaced links can be expected to operate 1,250 hours before resurfacing is again necessary.

Material requirements are nominal, averaging about $\frac{1}{2}$ pound of electrode per link for two passes. Time required varies with the speed and skill of the welder. However, two layers can be applied to a complete set of D7 or D8 tracks in less than 60 hours. On numerous occasions this time has been trimmed considerably. Here again, the savings through salvage are great. On a large tractor, those links salvaged by resurfacing with 80 to 100 pounds of inexpensive electrode can save a ton of steel required for complete replacement.

Track-Roller Salvage

Track-roller assemblies which carry most of the weight of the tractor have three general points of wear: (1) the surface of the shaft, (2) the surface of the shaft bushings, and (3) the exterior surface which contacts the track links. Shaft and bushing wear is rather minor, but can be corrected by installing new parts or, preferably, by regrounding the shaft to a standard un-

(Continued on next page)

COMPACTOR

OBTAINED 90% OF MODIFIED AASHO COMPACTION IN

One coverage!"

ON MCGEE-TYSON AIR FORCE BASE

THE JOB—to compact 2 million yards of earth to 90% and 97% of modified AASHO for runways, aprons, taxiways and air force buildings.

TYPE OF SOIL—predominantly undesirable fat clay with small percentages of weathered chert, and high moisture conditions.

"IN our book, there have been few, if any, earth construction projects that experienced the fat clay, high moisture conditions existing at this airfield site. Using only sheepfoot rollers at first, we discovered that on fills with soils near optimum moistures, and on 4" lifts, a minimum of 6 passes were required to develop soil densities of 90% modified AASHO, and a minimum of 10 passes were required to reach densities conforming to the 97% requirements.

"... that's why we buy
CEDARAPIDS EQUIPMENT
says C. M. HART, Vice President for
HARRISON CONSTRUCTION CO., Alcoa, Tenn.

"But when we used the Cedarapids Model 60 Compactor on all fill areas, where moisture ran from 3 to 7% over optimum, a minimum of 3 passes for the sheepfoot rollers followed by one complete coverage of the Compactor assured densities of 90% of the required compaction values. Two additional coverages were sufficient to assure 90% of modified AASHO compaction. This was on the specified 4" lift depths, although the Compactor will effectively compact 12" to 36" lifts."

IT'S THE ONLY VIBRATORY RUBBER-TIRED COMPACTING UNIT AVAILABLE!

There's nothing like it!

AN ENTIRELY NEW PRINCIPLE... WEIGHT PLUS VIBRATION... PERMITS MORE COMPACTION THAN EVER BEFORE POSSIBLE... IN FEWER PASSES... AT LOWER COST. THE CEDARAPIDS COMPACTOR OFTEN EXCEEDS SPECIFICATION DENSITIES OTHER TYPES OF ROLLERS CANNOT REACH!

HERE'S HOW THE CEDARAPIDS COMPACTOR GETS RESULTS!

The Cedarapids Compactor operates on an entirely new principle... the flotation of heavy loads without lateral soil displacement, aided by a powerful compacting vibratory thrust through the pneumatic tires. This vibratory action does more than just press the soil down... it actually rearranges the soil particles, forcing out moisture and eliminating air voids to increase cohesion and mechanical bond. The rate of vibration, tire pressures and weight may be varied to meet specific soil conditions. On the McGhee-Tyson AFB job it was found that 75-lbs. tire pressure, 1200 cycles per minute rate of vibration, the full 30-ton weight of the unit, and 2 mph rate of travel applied an impact-compaction to the soil area under each tire approximately every $1\frac{1}{2}$ " of travel.

WRITE FOR THIS BULLETIN TODAY
It gives descriptive details and specifications of both the Model 60, weighing 60,000 lbs. and the Model 25, weighing 25,000 lbs., plus many typical job test reports.

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COST REDUCING EQUIPMENT

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.



Proper Welding Can Salvage Track Parts

(Continued from preceding page)

dersize and installing undersize bushings currently offered as service parts.

The more obvious wear on track rollers results from impact and abrasion on the exterior surfaces and guiding flanges which contact the track links. Much can be done to extend roller life simply by maintaining proper track adjustment and alignment, and, of course, correctly lubricating the rollers.

Rims and flanges can be restored to usable size with weld metal, provided this service is not delayed. It is not necessary to determine wear limits entirely by the original hardness depth (about $\frac{1}{8}$ inch), although it is advantageous to do so. Actually wear can progress far beyond the original depth of hardness until there is no longer any clearance between the roller rim flanges and the extended pin bosses of the links.

The clearance between bosses and roller flanges is also a function of the wear existing on the track rails. Prescribed maximum wear limits for rollers are only approximate, as they take into account the probable wear that will exist on track links at this same time. As with worn grousers and links, excessively worn rollers only add to their own destruction as well as to the eventual failure of links and other track parts.

On track rollers, semiaustenitic (work-hardening) weld deposits properly applied are somewhat more long-lived than are those made of medium or high carbon. Of the several types and brands tested, according to Mr. Woodling, relatively few showed any marked tendency to spall off—even with multilayer deposits under very severe scuffing loads. In attempting to duplicate the original hardness of the roller, several types of self-hardening (by sudden cooling) electrodes were applied to a properly prepared underlay surface. In nearly all instances

these deposits (which were above C-55) checked or flaked off rapidly under impact loads. For this reason, he does not recommend application of the self or air-hardening types of hand-welding electrodes.

Application of multilayer weld overlays to track rollers is not difficult nor critical. Cleanliness of the base metal is important; otherwise excellent overlays can be ruined by a slag inclusion which checks or breaks. A good buffing or grinding of the worn roller is recommended. Preheating is again very helpful, regardless of the electrode selected, and with some of the work-hardening electrodes almost essential for a solid base weld. Medium and high-carbon deposits can be initially applied and finished over with a final pass of work-hardening electrodes as a cost-reducing measure.

For hand weld work, lateral beads are preferable to circumferential beads. Circumferential beads have been found more susceptible to cracking than lateral beads. Further, the circular beads

often lead to severe and unequal bearing-bore distortion or shrinkage.

Lateral beads laid in 2 to 3-inch-wide pads, staggered 180 degrees around the roller until a complete overlay is made, rarely cause more than 0.002 to 0.005-inch bore distortion or shrinkage. Overheating, of course, must be avoided; this can best be accomplished with

(Concluded on next page)



MARION
BODIES AND HOISTS

Bodies and Hoists

More
Less



"Designed on the Job"

MARION
BODIES AND HOISTS

The workload capacity of any dump body is directly proportional to the efficiency of the hoist. That's why Marion Hoists turn out more work at less cost.

You see—Marion Hoists operate at a low uniform oil-pressure throughout the dumping cycle . . . regardless of load or dumping conditions. This means less wear and tear on vital parts and a smoother, more dependable dumping operation.

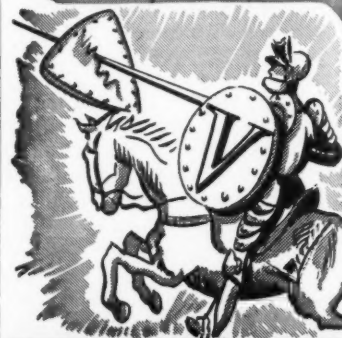
Consequently, Marion owners get more work . . . yet enjoy trouble-free operation, thus cutting maintenance and down time to a minimum.

This is just part of the story, your nearby Marion Distributor can give you all the facts and figures . . . or write direct. There's no obligation, of course.

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Marion, Ohio, U. S. A.

Manufacturing a complete line of standard and special Hydraulic Hoists and Dump Bodies

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SUPER-VULCAN
OPEN TYPE
DIFFERENTIAL-ACTING
PILE HAMMERS
18C, 30C, 50C and 80C

• Brute force and speed backs every powerful Super-Vulcan blow to drive piles faster, easier, at less cost, with 25 to 35 per cent less steam per blow.

Rugged strength, simple design, positive action, durability and compactness are the basis for Super-Vulcan's efficiency, dependable performance and lasting service. The open type Super-Vulcan fits the same leads and uses the same accessories as the Vulcan Single-Acting Pile Hammer.

Find out about the super performance of Super-Vulcan—the pile hammer that delivers twice the usual number of blows per minute. Write today for full details.



Size 18C-30C-50C-80C meet all needs

VULCAN IRON WORKS
Since 1852

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Now!

BUY used equipment
SELL used equipment
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through
The Trading Post Section of
CONTRACTORS &
ENGINEERS MONTHLY

See page 119.

a piece of wet burlap inside the bore. It is of interest to note that failure to control the heat input, and the use of circumferential beads, has resulted in bore shrinkage as high as 0.015 to 0.018 inch.

Rollers may be resurfaced while assembled to the track roller frame. But this is not good practice, as the lubricant within the rollers may char or burn. Also the dirt seals are very susceptible to damage from heat. If the seals are removed and overheating is avoided, rollers can be resurfaced with the shaft and bushings in place.

Smooth weld deposits are essential to the ultimate wear life, particularly if the deposits are work-hardening. High spots become very hard in a few hours of operation and may be the cause of premature failure due to spalling or cracking. The work-hardening semiaustenitic deposits usually must be ground, as they are virtually impossible to machine. Deposits of medium or high carbon can be quickly smoothed up in a lathe. In either instance, the smoother the weld job initially, the longer it will last.

The thickness of overlay seems to be limited to about three layers or $\frac{3}{8}$ inch, although many rollers have operated with a greater amount. Underlayer cracks, presumably caused by the severe distortion of the upper weld beads, are much more common on heavy deposits. There should, however, be no fear of applying four layers if necessary, providing they are carefully applied.

Distortion of the bearing bores is more of a nuisance than a problem. Some distortion occurs regardless of how the roller is welded. By preventing overheating and using the pad method of application, distortion or shrinkage can be limited to the point where it is unnoticeable. Some minor shrinkage may be desirable to tighten the fit between the hub and the shaft bushings. A cylinder boring bar mounted on a suitable fixture makes an ideal tool for straightening distorted roller hub bores.

Roller flanges also wear because of the side thrusts imposed upon them in turns and on hillsides. Flanges can be restored with weld, but here the problem is a little different since strength must be restored to the flanges. High-tensile-steel electrodes can be used, but the best success has been with medium-carbon types. These deposits have considerable tensile strength, and, of course, excellent wear qualities. Roller flanges should be brought back to as near their original shape and thickness as possible. The weld application is made in a series of concentric beads, washed into the overlay applied to the rim surfaces.

Severely worn rollers require from 4 to 6 pounds of electrode to bring them up to a usable size. Average application time is 4 to 5 hours, although some welders have been able to cut this time in half with positioning fixtures.

Wear rates of built-up rollers are well within expectations. A properly restored roller will offer better than half the life of a new roller. There are numerous instances where rollers have operated over 2,000 hours before being again resurfaced. There seems to be no limit to the number of times the roller can be restored. Double-flange types are often converted to single-flange types and continued in operation.

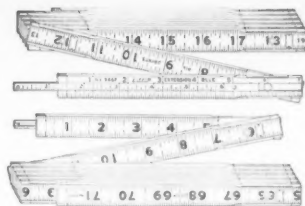
Material savings with this salvage operation are high. Four to 6 pounds of electrode and around 5 hours of labor will restore a roller initially weighing 90 pounds. On a large tractor, this represents a saving of 980 pounds of steel which would be required for replacement.

Insure your own personal security and that of the nation by regular investment in U. S. Defense Bonds.

New Extension Rule

An extension rule for accurate inside, outside, regular, and flat-reading measurements is announced by Lufkin Rule Co., Saginaw, Mich. Numbering begins at the extension end of the rule, both sides, for flat-reading or for regular measurements. In flat reading the measurement is said to lie close to the work—even when the rule is partly open. The brass extension slide allows inside measurements up to 78 inches. A stop prevents the brass slide from coming out.

The company points out that the X-46F rule is constructed of extra-heavy sections of select hardwood. The boxwood finish is further protected by a tough, clear, plastic coat. The large



Inside, outside, regular, and flat-reading measurements are possible with the Lufkin extension rule.

bold figures are easy to read against the uniformly light background. Brass strike plates prevent wear. The brass end caps are flush inlaid and riveted. The riveted spring joints are the patented Lufkin double-locking type, de-

signed to maintain accuracy. Both edges of both sides of the rule are graduated. Folded length is 8 inches.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 182.

Hyster Advances Fletcher

Bob Fletcher has taken over the post of Eastern Parts and Service Manager for Hyster Co., Portland, Oreg., manufacturer of lift trucks, mobile cranes, Straddle Trucks, Turret Trucks, and attachments for Caterpillar tractors. Mr. Fletcher has been with Hyster for over 11 years and for the last year he has been District Representative in the Tractor Equipment Division.



2 LAPLANT-CHOATE MOTOR SCRAPERS

AVERAGE 20 MILES PER HOUR

MOVING RIPPED BLACK TOP

for

Weldon Zaske Construction Company
Danube, Minnesota



Note the extra high apron lift of the TS300 for dumping bulky heavy materials.

CHECK THESE OTHER BIG-PRODUCTION FEATURES

- ✓ BIG CAPACITY . . . 14-cu. yds. struck and 18-cu. yds. heaped, to haul bigger payloads
- ✓ HIGH SPEED . . . over 22 mph, assures lower average cycle time
- ✓ BIG POWER . . . your choice of a 285 HP Buda or a 275 HP Cummins diesel for fast acceleration and extra power when you need it
- ✓ EASY LOADING CHARACTERISTICS cut more valuable seconds off your cycle time
- ✓ EXTRA HIGH APRON LIFT and positive forced ejection mean faster, smoother spreading

MOVING 18,000 yards of ripped up black top at a 20 MPH clip is typical of the speedy performance of LPC TS300 Motor Scrapers. When County Road 22, four miles north of St. Peter, Minnesota, had to be ripped up and stockpiled for re-use, Weldon Zaske of Danube used two Motor Scrapers to speed the job. Large, heaping loads of the bulky material were picked up in 45 seconds in a distance of 60 feet, and on the one mile haul to the stockpile, the rigs averaged 20 miles per hour! Loads were ejected in 15 seconds.

This example of the TS300's productive speed is just one of the reasons why so many contractors like Weldon Zaske are choosing LaPlant-Choate Motor Scrapers to set the pace on the toughest jobs.

LAPLANT

MANUFACTURING CO., INC.



CHOATE

CEDAR RAPIDS, IOWA, U. S. A.



Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.



2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.



Hydraulic and Cable-operated Dozers.



Truck-Tarp keeps cargo or crews snug and dry in all weather, according to its manufacturer, Metalfab Corp.—and is a cinch to install.

All-Weather Canopy For Cargo Protection

An all-weather pickup truck canopy for protecting personnel or cargo is marketed by Metalfab Corp., P. O. Box 5956, Dallas, Texas. Truck-Tarp is made of heavy 17-ounce double filled duck. It is mildew-resistant, waterproof, and reinforced at points of greatest wear.

The frame is made of 14-gage rust-resistant channel steel. The legs fit into stake pockets in the truck bed. Wing nuts hold the three ridge bars to the cross bows. The canopy is held down on the sides by zinc-plated springs, assuring a snug fit under all weather conditions. Roll-up sides and windows are available at slight extra cost.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 163.

New Booklet on Microwave

A new brochure entitled "What Is Microwave" describes the latest developments in radio equipment for point-to-point communication or remote control.

It explains how any factor that can be translated into an electrical impulse, such as pressure, temperature, or engine speed, can be transmitted by means of microwave equipment from various points to a central location where recorders will provide an in-

stantaneous reading. It also shows how equipment in operation at unattended stations may be started, stopped, and regulated by means of impulses transmitted by radio.

A single RCA microwave circuit affords as many channels as a 24-channel wire-line system, and each of these may be subdivided into as many as 18

signal circuits for use in telemetering, remote operation, or supervisory and load control, or as tele-typewriter channels.

This literature may be obtained from RCA Victor Division, Radio Corp. of America, Point and Cooper Sts., Camden, N. J. Or use the Request Card at page 16. Circle No. 192.

Only **TRIPLEX** BACKFILL TAMPERS offer you these **BIG** Advantages

FAST 75 sq. in. of effective compaction area pounded and vibrated at the same time, resulting in 5 times the speed of work by one man.

HIGHER LIFTS 20% higher lifts and still meets specifications. No wasted energy in recoil.

UNIFORM COVERAGE Easy to control, wide pattern makes systematic coverage of a compaction area easy.

EFFICIENT Only 1/2 inch vertical movement of unit allows ease of control. One man can do 5 men's job with less effort.

SAFE The hard-hitting butts are held away from the operator's feet by the wheelbarrow type handles.

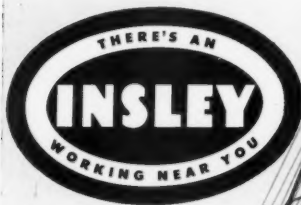
AIR CONSUMPTION A standard 105 cubic foot per minute portable air compressor is entirely adequate for the Triplex, which is accomplishing the same work that ordinarily would require a 210 c.f.m. compressor.

Write or Wire Today FOR DESCRIPTIVE LITERATURE AND PRICES

GUNDERSON-TAYLOR MACHINERY CO.
988 CHEROKEE STREET DENVER 4, COLORADO



Patented



ASK THE OPERATOR—
HE KNOWS

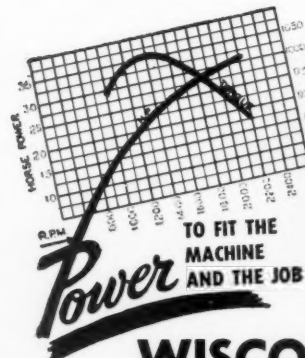


The **INSLEY** operator knows..



that Insley Equipment can be rated-for-the-project . . . he knows that specification alternates make it possible to buy the exact equipment to do his job best.

INSLEY MANUFACTURING CORPORATION • INDIANAPOLIS 6, INDIANA



WISCONSIN-POWERED Ingersoll-Rand Compressor

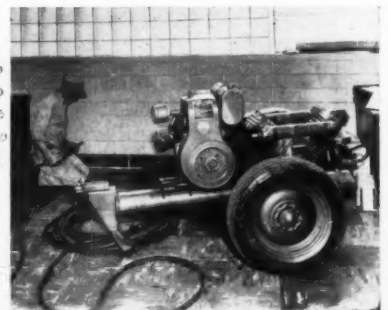
Wheeling a modern, mobile compressor to any spot it's needed is easy when it's an Ingersoll-Rand. Then doing a day's work on location is also a "sure thing" if a Wisconsin Heavy-Duty Air-Cooled Engine supplies the power.

The search for full-rated power that's dependable ends almost always with Wisconsin Engines . . . first choice everywhere, 3 to 30 hp. For example, every Wisconsin Engine crankshaft rides at both ends on tapered roller bearings, reducing the chance of bearing failure. Also, Wisconsin Engine magnetos mount on the OUTSIDE for easy servicing, but most important each magneto is equipped with an impulse coupling for quick starts in any weather. Steady running is assured, too, because of fool-proof air-cooling, summer and winter. Follow the lead of many who say, "Wisconsin Engine Power fits the machine and job." And, write today for "Power Magic" covering all 4-cycle single-cylinder, 2-cylinder and V-type 4-cylinder models, 3 to 30 hp.



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN



The 1951-52 Edition of **CONTRACTORS AND ENGINEERS MONTHLY'S** "Where To Purchase Guide" is now available. If you wish a copy of this pocket-size booklet of names and addresses of manufacturers and suppliers of hundreds of construction products, circle No. 225 on the reply card to be found in this issue facing page 16 and mail card to

CONTRACTORS AND ENGINEERS MONTHLY

470 Fourth Avenue, New York 16, N. Y.



The Hydra-Flex one-man chain saw operates hydraulically. Its hydraulic pump fits the power takeoff of tractors, Jeeps, or trucks.

One-Man Chain Saw With Hydraulic Power

A one-man chain saw operated hydraulically from a tractor power takeoff has been announced by Von Ruden Mfg. Co., Claremont, Minn. Made in 18 and 27-inch models, the Hydra-Flex can transmit 12 brake hp to the chain.

The gear-type powerhead works from 3/4-inch hydraulic hose. The chain speed is 1,300 fpm. A safety by-pass valve protects the operator—and the saw, if pinched or crowded beyond its capacity. The total weight for the 27-inch size is 30 pounds.

The company points out that hydraulic operation makes use of available power, provides smooth transmission of power, and offers flexibility of operation.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 159.

Bulletin on Line of Chucks

A line of straight-hole and threaded chucks is described in a bulletin available from The Jacobs Mfg. Co., West Hartford 10, Conn. The straight-hole model is used for drill presses, shafts, and lathes. After the drill is inserted in the jaws, the sleeve is tightened by hand and a cam is actuated which locks the jaws.

The threaded model for portable drills operates like the straight-hole type except for the threaded body

which screws into the spindle. Both models are made in capacities up to 1/2 inch.

This literature may be obtained from the company by requesting Bulletin 50-X, or by using the Request Card at page 16. Circle No. 112.

New Mixer Features Truck-Engine Drive

A truck mixer with truck-engine drive is announced by The T. L. Smith Co., 2835 N. 32nd St., Milwaukee 10, Wis. It comes in 4 1/2, 5 1/2, and 6 1/2-yard sizes. Because the engine on the mixer is eliminated, the deadweight of the mixer is reduced by about 1,300 pounds; hence it can carry bigger payloads without exceeding highway weight limits, the manufacturer says.

The over-all length of the new model is reduced approximately 19 inches. Considerable weight is shifted from the rear axle to the front axle, thereby enabling operators to meet rear-axle

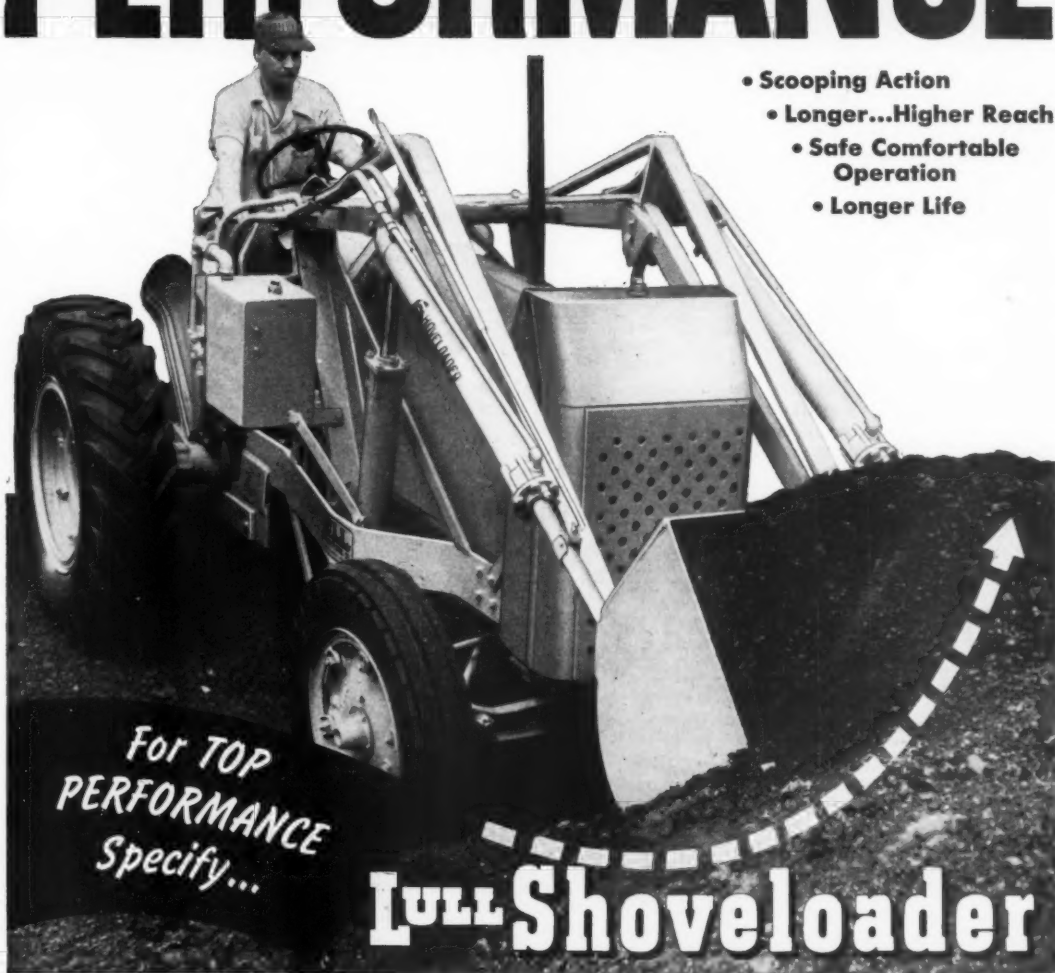


Deadweight of the new Smith truck mixer has been reduced about 1,300 pounds by using a truck-engine drive and eliminating the engine on the mixer.

load restrictions. The company points out that truck-engine drive reduces fuel consumption and maintenance.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 130.

NOTHING PAYS OFF LIKE... PERFORMANCE



- Scooping Action
- Longer...Higher Reach
- Safe Comfortable Operation
- Longer Life

NOW! BUCK gives you the only complete automatically-portable heavy-duty **HOISTING MACHINE** in the world!

Set up and ready to operate in less than 25-minutes... instead of hours!

Ready - rigged, self-erecting tower. Self-erecting to 40-feet, additional sections may be added if needed.

Wheels retract automatically when tower goes up... return to towing position when tower is lowered.

Raises 2000-pound load at rate of 100 feet per minute.

Pneumatic trailer mounted... finger-tip balance. Easily towed by pick-up truck.

Send now for complete specifications Dealerships available

BUCK EQUIPMENT CORP.

208 Butler St., Cincinnati 2, Ohio

LULL SHOVELLOADERS are specially engineered to mount on and utilize the full power of industrial wheel-type tractors.

Outstanding performance makes Lull Shovel loaders top money-makers in the construction business. Field competition has proved time and again that Shovel loaders can move more material... faster and at lower cost than any comparable machine.

A clue to Shovel loaders' performance is the faster and smoother loading cycle. (1) Shovel loaders' powerful crowding action scoops up heaping buckets at every pass. (2) Shovel loaders' full hydraulic control gives the operator finger-tip command of hoisting, tilting and dumping. (3) Shovel loaders' higher lift and longer reach load trucks and bins from one position—cuts backing, turning, and blocking of traffic.



Learn how you can profit by Shovel loader performance. See your Lull Distributor, TODAY... or Write to:

Manufacturing Company

322 W. 90th St. • Minneapolis 20, Minn.

Wood-Preservation Data

A 40-page answer book on pentachlorophenol, a chemical used to protect wood against decay and insect attack, is offered by Monsanto Chemical Co.,

1700 S. Second St., St. Louis 4, Mo. The 51 questions answered in the booklet are those which Monsanto representatives have been asked most often. They range from "What is Penta?" to "How do Penta solutions preserve

wood?" The booklet covers types and methods of application.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 16. Circle No. 154.



Floor cutting in industry for machine installation.



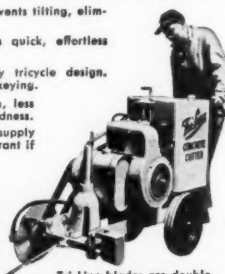
Cutting contraction joints on new airport construction.

SAWING CONCRETE SAVES TIME, LABOR MAKES REPAIRS PERMANENT... TRI-LINE OPERATION IS ECONOMICAL... FAST... EASY

Highway officials and contractors everywhere are recognizing the importance of concrete sawing for faster, low-cost maintenance... for contraction joints on new pavement construction. Sawing with a Tri-Line first saves on labor cost... second, produces tight joints that will not spall, eliminating all after-maintenance headaches. Before you buy any saw, ask for a free Tri-Line demonstration on the job. You'll see why Tri-Line has been proclaimed "Best by Test."

Only Tri-Line Gives All These Advantages!

1. Exclusive three-wheel undercarriage prevents tilting, eliminates blade bind and excessive wear.
2. Direct-acting hydraulic control permits quick, effortless depth-of-cut adjustments.
3. Maximum maneuverability afforded by tricycle design. Turns within its own length without jockeying.
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5. Thirty-gallon tank provides water when supply is inconvenient. Can be attached to hydrant if desired.
6. Vital engine parts protected from blade spray. No shut-downs due to engine "drowning."
7. Abundant power from the 13 h.p., two-cylinder Wisconsin air-cooled engine for full-depth, full-speed cutting.
8. Double-ended arbor permits cutting on either side of the machine... in places normally inaccessible.



Tri-Line blades are double-banded, scientifically designed for fast, clean-cutting operation.



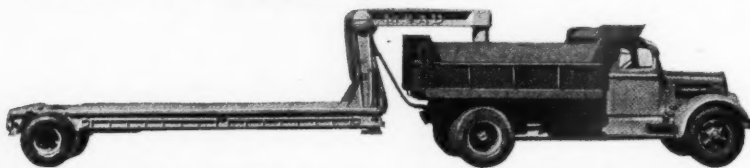
Write for FREE Illustrated Brochure which gives complete specifications and construction details, and the name of our nearest representative, without obligation.

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The New MEAD Semi-Trailers



- Designed for transporting construction equipment
- Available with tandem—trunnion or single axles

- Fits in all dump truck bodies
- Frames of electrically-welded structural shapes—capacities 10 to 30 tons

We also manufacture conventional Goose Neck Trailers for tractor operation
Write for information to:

MEAD Machine and Iron Works, Inc. 606 Lexington Avenue, WARREN, PA.

THURMAN Heavy Duty PIT SCALE

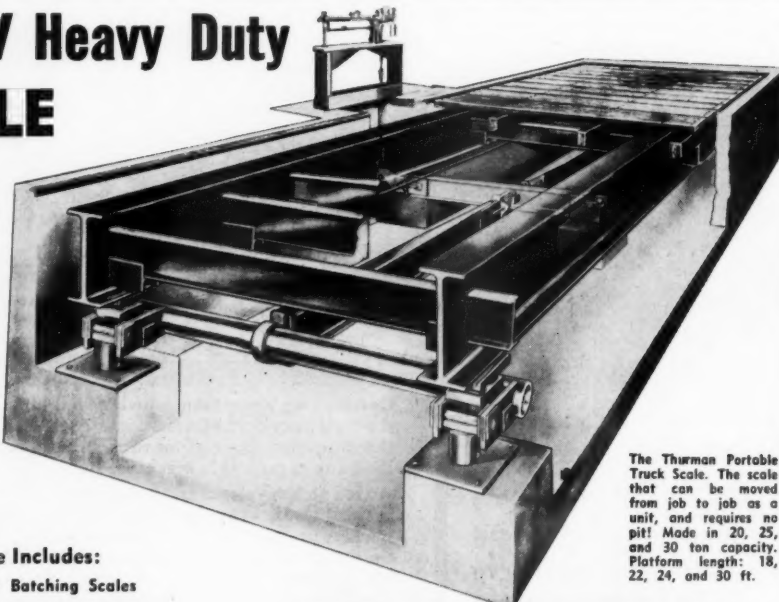
Platforms:
18 to 50 Feet

Capacities:
20 to 50 Ton

Built to rigid U. S. Bureau of Standards specifications. Pivots and bearings of fine heat-treated steel, electroplated to resist corrosion. Castings and forgings are over-size for safety. I-beams and cross members are extra heavy structural steel. Pit preparation blue prints are furnished.

The Thurman Line Includes:

- Portable Motor Truck Scales
- Pitless Scales
- Wheelbarrow Scales
- This and other weighing equipment in sizes to fill your requirements.
- Batching Scales
- Liquid Weighing Scales
- Warehouse Scales



The Thurman Portable Truck Scale. The scale that can be moved from job to job as a unit, and requires no pit! Made in 20, 25, and 30 ton capacity. Platform length: 18, 22, 24, and 30 ft.

THURMAN MACHINE CO.

Scale Division

Established 1918

156 North Fifth Street

Columbus 15, Ohio

Job Budget, Plans Must Include Safety

The Anticipation of and Planning for Possible Public Liability and Working Hazards Pay Off in Profitable and Successful Job Performance

• THE importance of anticipating accidents and planning to prevent them was the theme of the Construction Session of the 27th Annual Western Pennsylvania Safety Engineering Conference at the William Penn Hotel in Pittsburgh, April 15. The session was sponsored by the Construction Section of the National Safety Council. Presiding was S. D. Webb, Safety Supervisor, Contracting Division, Dravo Corp., and a member of the NSC Construction Section's Executive Committee.

The speakers were Albert J. Tonry, Insurance Consultant, B. Perini & Sons, Framingham, Mass., and Joseph A. De Luca, Safety Superintendent, Construction Division, E. I. du Pont de Nemours & Co., Wilmington, Dela. Mr. De Luca is a past General Chairman of the NSC Construction Section and a member of its Executive Committee.

Public-Liability Hazard

Mr. Tonry takes a rather dim view of human nature these days. Claim-consciousness has become an overwhelming force, he said. Otherwise honest people, who may go to great lengths to locate the rightful owner of a wallet they find, have no qualms at all about making dishonest or exaggerated claims of damage to their persons or property as a result of construction operations. Accordingly, contractors cannot be too careful about protecting themselves against such claims by anticipatory investigation and planning.

There are several steps to take: (1) sufficient insurance of the right type; (2) careful property inspection before starting work; and—of course—(3) seeing to it that the work is done without damage to property and people.

Mr. Tonry was most concerned, however, with the questionable claims filed against a contractor. Many contractors have been just plain lucky that their oversight in the matter of insurance didn't put them out of business. "But you can't gamble and win forever," he said.

Insurance can be tailored to meet the special conditions of every job. And contractors should remember, he added, that the prime contractor is responsible for any damage caused by his subcontractors. Even though a subcontractor signs an agreement assuming the responsibility, the prime contractor is still responsible and may be sued along with the subcontractor.

(Continued on next page)

STEEL SHEET PILING



BEVAL Z
perfect range of corrugated sections most economical section moduli

AMERLUX
STEEL PRODUCTS CO.
NEW YORK 17, N. Y.

ARBED
STEEL MILLS
IN LUXEMBOURG

BEVAL P straight web section best defined hooking

Tonry suggests a conference with one's insurance carrier before the start of every job. The contractor should be frank and set forth all the facts, to get proper coverage for his exposure. He should remember, too, the difference in state laws. His liability in the matter of blasting is quite different in Pennsylvania, for example, than in Massachusetts. So each new job presents a new and different potential liability, especially if in a different state.

Once adequate and proper insurance is arranged for, the contractor should make a careful inspection of adjacent property—inside as well as outside of buildings. The condition of building foundations, walls, etc., should be recorded; cracks and defects measured, described, and photographed. Only with an accurate and detailed knowledge of existing conditions can dishonest or exaggerated claims be met.

Mr. Tonry cited the Squirrel Hill Tunnel in Pennsylvania as a case in point. Despite constant tests to be sure blasting was being done well within the limits of safety, over 800 damage claims were filed. Nothing of the sort had been anticipated, and it was impossible to understand how such damage could have occurred. Nonetheless, more than \$700,000 had to be paid out. So—summarized Mr. Tonry—be sure of adequate public-liability insurance!

What About Cost of Safety?

This question was raised by Mr. De Luca. It is generally agreed, he said, that about half the cost of construction goes for materials; the other half for labor. Contractors worry considerably about material costs—how to decrease them, how to avoid waste, etc. But what about labor? In too many cases, contractors just "hire" labor—and that's the end of it.

To operate a job profitably, there must be as much concern over the effective use of labor as over the effective use of steel or concrete. And one phase of this is safety. On the material side of life, he said, we are well developed; we are miserably lagging in dealing with the human factor so far as effectiveness is concerned.

What does safety cost? A careful analysis of du Pont construction activities over the past two decades shows that the cost of an adequate safety program is 1/2 of 1 per cent of the job payroll dollars. Here's one example:

Project (in 1947)	16,199,413 hours of work
Average pay rate per hour	\$1.75
Cost of adequate safety program	\$164,490.00

Thus, the total payroll was \$28,348,972.00. When the safety-program cost is divided by this payroll, the result is 0.0058 (or approximately 1/2 of 1 per cent of the payroll). Examples from other projects indicated the same percentage of expenditure for an adequate safety program. It should be noted that the 1/2 of 1 per cent came about by supplying the required safety; then determining what it cost.

Of the amount spent for safety on du Pont construction jobs, Mr. de Luca reported, 15 per cent goes for safety-personnel salaries; 5 per cent for safety equipment (such as respirators, safety belts, goggles, etc., less employee purchases of shoes, hats, and gloves which are sold to employees at cost); and 80 per cent for time devoted to meet-

ings, education, and reminders.

Now—what do accidents cost? Here's one example:

Direct Cost	
Workmen's compensation award (loss: right index finger)	\$300.
Medical costs	150
Total	\$450
Indirect Cost	
Damage to work in progress	\$865.00
Damage to cam and shaft of press	451.97
Loss of time of foreman (reports and case follow-up)	26.73
Replacement of operator	259.00
Time lost by neighboring workmen (4 men x 3/4 hour x \$1.20 per hour)	3.60
Loss of production due to temporary stoppage of other work	37.68
Total	\$1,643.98

These actual figures show that the indirect costs were 4 times the direct cost (the generally accepted ratio) and that the total cost of this accident was \$2,093.98.

Here are some more figures on accident costs per \$1,000,000 of construction work. If the total cost of a project is \$1,000,000, the cost for labor would be \$500,000. Assuming \$2.50 as an average

hourly rate, the job would involve 200,000 man-hours of work. The U. S. Bureau of Labor Statistics says we may expect 45 accidents per 1,000,000 expo-

sure hours. Therefore, 200,000 exposure hours may produce 9 accidents. If each accident costs \$750 (a conservative estimate), the total cost would be \$6,750. (Concluded on next page)

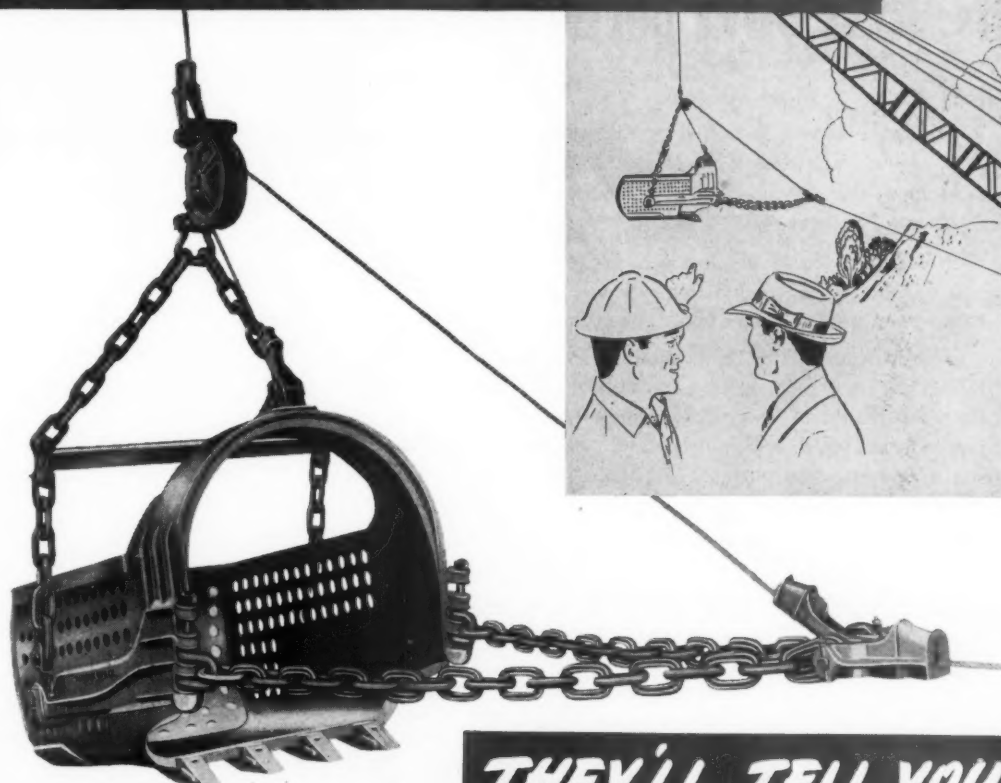


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AMERACO

Dept. B, 1047 E. 76th Street Chicago 19, Illinois

Job Budget, Plans Must Include Safety

(Continued from preceding page)

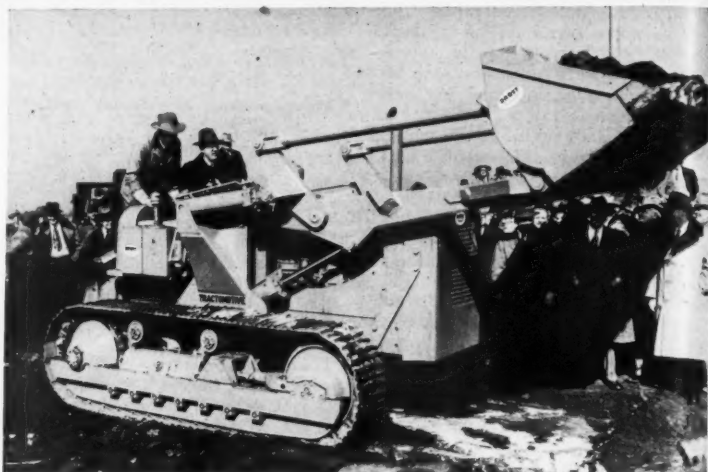
tive figure below the industry average) the total direct cost will be \$6,750; the indirect costs, \$27,000; and total direct and indirect costs, \$33,750. Each \$1.-000,000 of construction costs the industry \$33,750 for accidents. Can the industry afford it?

Let's look at insurance rates. The average workmen's compensation insurance rates for 12 to 15 different crafts engaged in heavy construction have, from 1940-1950, been about \$5.25 per \$100 of payroll. Because of a consistent and thorough safety program, du Pont has regularly procured coverage, based on performance rating, of \$2 per \$100 of payroll. After work has been in progress for some time, rates have dropped to 75 cents and even as low as 43 cents per \$100 of payroll. Worth paying attention to safety? Just figure it out with your own payroll.

If a safety program can be summed up in one word, Mr. De Luca said, that word is anticipation. Whether the job is large or small, whether the force is 100 or 45,000 men, safety engineering can be done the same way, using the same techniques, with relatively constant favorable results.

As in any other phase of the work, a safety program requires knowing at all times cost, performance, schedules, plans, and results. To achieve safety on your job takes time and effort; it means taking off your coat and sweating it out; it means constant vigilance. It comes from the proper initiating action, supervisory interest, discussion with foremen and men, adequate anticipatory planning before assigning work, employee understanding of the "why" and "how", compliance, cooperation and teamwork—in short, participation by everyone.

And it pays—in dollars and cents because the objective is always set at obtaining more effectiveness (dependability) out of people.



An Allis-Chalmers HD-9G tractor with a Drott front-end shovel starts the construction of Milwaukee's huge system of expressways. Mayor Frank P. Zeidler is the operator breaking ground for the \$100,000,000 project, which will take some 25 years to complete. Speedway Contracting Co. and Druml Co., Milwaukee, hold the \$700,404 contract for grading and drainage structures in the first sections at 44th Street.

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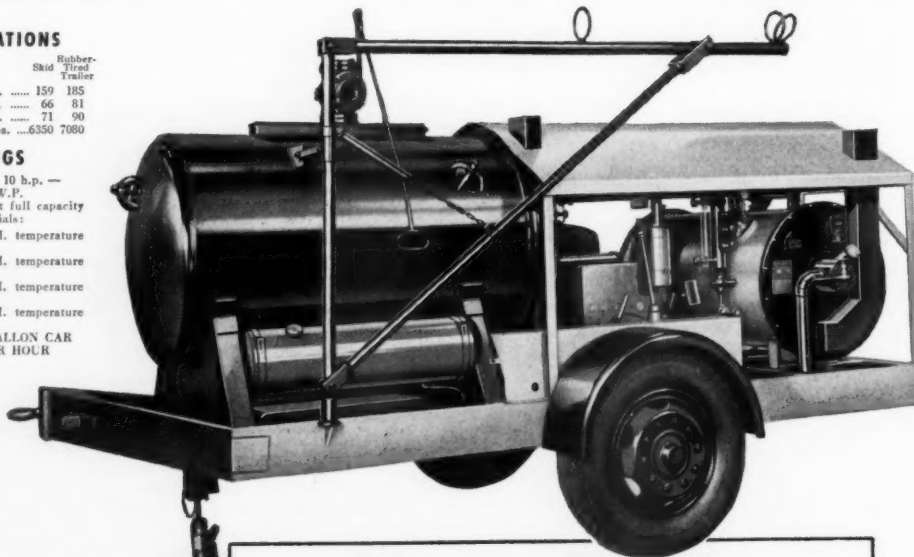
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Skid
Rubber-
Tired
Trailer

Overall length, in. 159 185
Overall width, in. 66 81
Overall height, in. 71 90
Shipping weight, lbs. 6350 7080

RATINGS

Steam Boiler—10 h.p.—
125 lbs. W.P.
Operating burner at full capacity
and pumping materials:
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rise 25-35°F.
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rise 45-55°F.
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Marine-Construction Crews Salvage \$3,000,000 Dredge

Twenty-Foot-High Timber Cofferdam Built on the Main Deck Encloses Open Hoppers and Supports Unwatering Pumps.

By MICHAEL A. SPRONCK,
Associate Editor

A SENSE of urgency surrounded the salvage of the 10,000-ton sea-going dredge Sandmate. The divers, dockmen, welders, and carpenters pushed the work along, trying to set time and cost-saving records in the recovery of the \$3,000,000 ship. The operation was unique from a management viewpoint. Construction Aggregates Corp., owner of the ship, used its own engineering force to raise the vessel from a watery grave, following an interesting yet simple salvage operation developed by Roy A. Brinkman, Vice President of CAC, and Paul H. Blair, its Naval Architect.

Dredge Serves Turnpike Job

The circumstances surrounding the loss of the ship were also unusual and might have come straight out of a modern sea story.

Construction Aggregates had converted the ship from a hopper dredge to a self-unloading hydraulic dredge in October, 1950. Her first (and thus far only) job was supplying sand for hydraulic fill on CAC's New Jersey Turnpike and Newark Airport contracts. The job was apparently routine. Two times a day the Sandmate would make the trip out to the loading area off Coney Island, N. Y., suck 2,700 yards of specification sand into her hoppers, and then ply the 16-mile route back to the discharge area at Port Newark, N. J. But the trick of the job was the navigation. Leaving the loading grounds, the 10,000-ton ship had to edge along the Lower Bay, pass through the Narrows into busy Upper New York Bay, move through the Kill Van Kull to Newark Bay, and up the bay to the discharge basin.

Foul Weather Strikes Ship

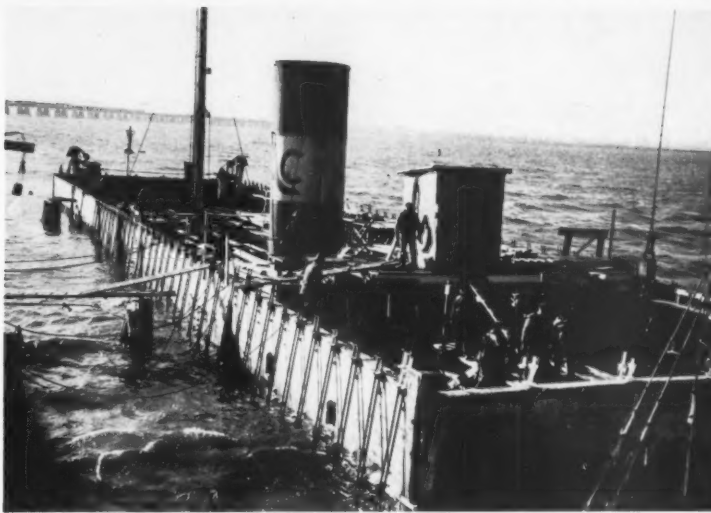
May 24, 1951, the Sandmate was plowing her way through the Kill Van Kull with a full load of sand in her hoppers when a series of freak conditions arose. The weather was bad, the tidal flows were fast, and the combination became a nightmare.

The Atlantic tides feed into Newark Bay through both the Kill Van Kull and the Arthur Kill. Though the two Kills join at the southern tip of the bay, they ordinarily don't present a problem to a ship making a starboard turn from the Kill into the bay, since both move up into the bay. But this night there was strong wind moving down the bay. The bay water piled up high at the junction and bucked the tidal flow through the Kills. White water obscured jagged rocks which lay only a few feet below the surface at the channel edge. The Sandmate's skipper knew they were there and did his best to maneuver the heavily laden ship to give them a wide berth. In spite of all his efforts, however, the broadside wind and heavy sea forced the ship along the razor-edge rock outcropping and they sliced the steel plates in several places on the starboard side.

Full extent of the damage was not apparent immediately, so the skipper kept on course as best he could, trying to make the last 2½ miles up the bay. A quarter mile beyond this point it be-

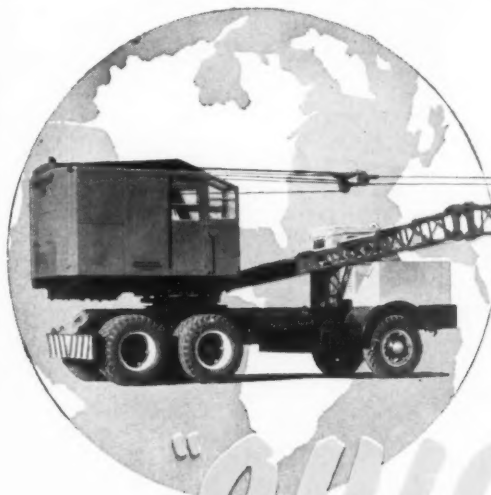
came obvious that the ship could not make it all the way to port. The skipper started unloading the sand immediately and headed for shore. Riding a full tide, the Sandmate came within 250 feet of the beach and rested neatly on a clay bank in about 25 feet of water.

Salvage would have been easy except—
(Continued on next page)



C. & E. M. Photo

Like a cheesebox on a raft—the cofferdam built on the deck of the Sandmate to enclose all hoppers, gangways, vent pipes, etc. so she could be raised.



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X marks the spot of the Sandmate's sinking when she was laden with sand fill for the New Jersey Turnpike.

Construction Crews Salvage Sunken Dredge

(Continued from preceding page)

cept for the receding tides. The ship slipped down the steep bank with each change in tide, finally coming to rest on the bottom of the channel 38 feet below water surface. Fortunately, though, she stayed on a near-even keel, listing only slightly to port.

In October, 1951, CAC made the decision to recover her from Newark Bay. It was apparent that the operation would not be easy, but on the other hand neither would it be easy to get steel for a new ship. There were four phases of work to be undertaken before the ship could be raised. CAC crews had to remove the sand from the hoppers, enclose all open areas to the hold, patch the holes in the hull, and stabilize the ship so she would rise on an even keel.

Air Lift Removes Sand

The construction gang first tackled the problem of getting the sand out of the hoppers of the ship. Due to the suddenness of the sinking there were still some 2,400 cubic yards in the hold. A 10-inch air lift powered by two Joy 630-cfm compressors did the trick. Hooked to a single receiver tank, the two compressors fed air down a 2-inch line to a collar around the 10-inch lift pipe and through four 1/2-inch holes into the pipe. A few feet below the collar, at the base of the air-lift pipe, four curving jet nozzles spewed a high blast of water into the sand. The air vacuum above the sand-water whirlpool carried the mixture up the pipe and into scows alongside the sunken dredge. All but a few yards of sand were recovered in this manner and placed on the Turnpike.

Five-Ton Panels Made on Shore

The sectional timber-wall cofferdam was unusual—175 feet long, 42 feet wide, and 21 feet high. It looked like a cheesebox on a raft. Fitted tightly to the main deck and rising out of the water even at high tide, the cofferdam enclosed all wells in the ship deck—the hoppers, gangways, vent pipes, etc.—and in that way provided a continuous hull, part old and part new, up and out of the water. The alternative would have been sealing the ship up tight before pumping—a costly undertaking in view of the large expanse of open deck on a ship of this type.

Carpenters built the cofferdam sections at the ship basin at Port Newark while divers removed all the deck equipment that would interfere with the placing of the panels (the removal was careful to save as much equipment as possible for re-use).

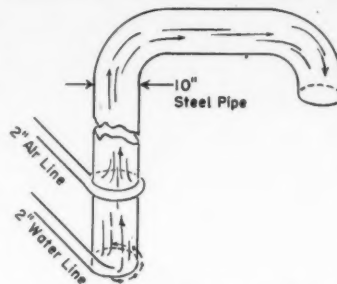
Twelve timber panels were made up on shore: five for each side and one fore and one aft. Each side panel was 35 feet wide, 20 feet high, made up of 2 x 8-inch tongue-and-groove sheathing nailed to 6 x 8 studs 19 inches on centers. The end panels were of the same construction but 42 feet wide. Horizontal 6 x 8 wales were bolted to the

top edge and across the studs at the third points of all panels. The lower edges of the panels were cut to fit the exact camber and sheer of the ship's deck. Dockmen fitted the bottom of each panel with a 2-inch felt base, covered by canvas, to account for rivets and overlapping of the deck plates.

The CAC shore crews also built the 17 deep timber trusses which were to be placed inside the cofferdam as bracing against wind, water pressure, and tide. Each truss, 42 feet long and 7 feet deep, was made with double 3 x 12 top and bottom chords and double 3 x 8's for the web diagonals and verticals.

Piling Acts as Guide Rails

Out on the water, marine crews were making additional preparations for the raising of the ship. CAC used a 25-ton-capacity derrick, and some other floating rigs, to drive two clusters of 12-inch H-beam piles at each side of the sunken dredge. The 65-foot-long piles were about 30 feet deep in



This 10-inch lift pipe, fed with compressed air, sucked 2,400 cubic yards of sand out of the Sandmate's hold before she was raised.

the channel bed and extended up to just about water level. Placed at the third points on each side of the ship, they were to act as guide rails preventing the ship from keeling over as she came to the surface.

Tie Rods Hold Panels to Deck

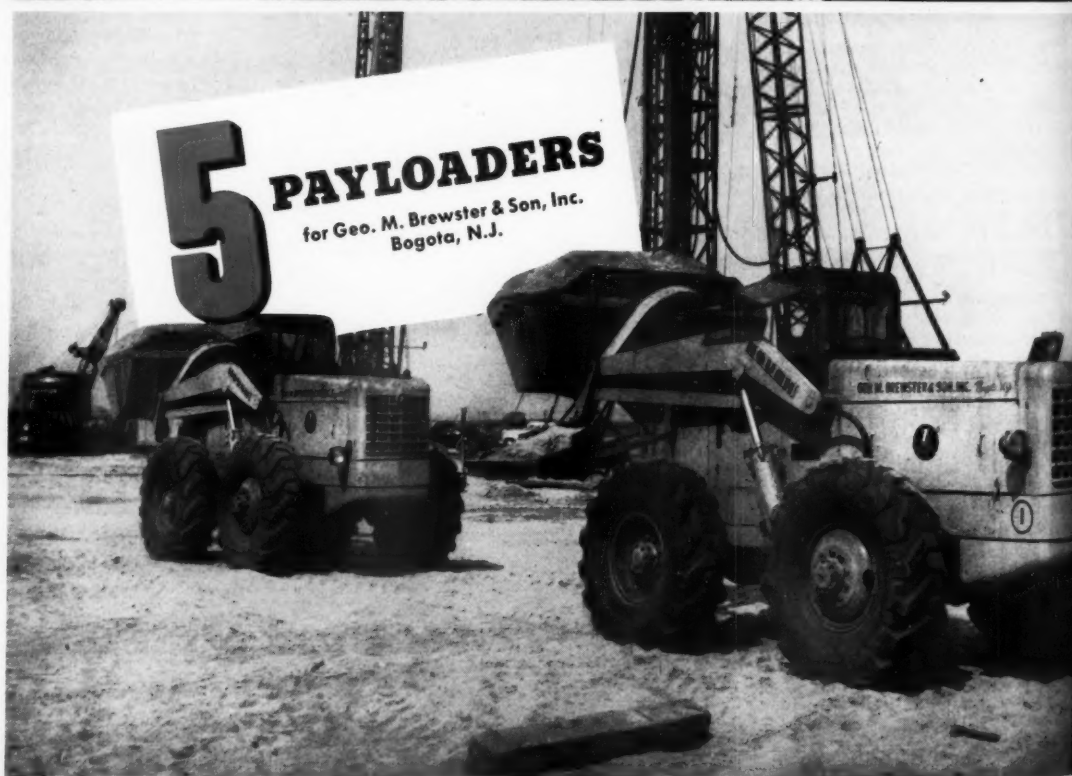
Tug-powered scows brought the fin-

ished 5-ton panels out to the salvage area. The derrick lifted each panel off the scow and held it in place while divers secured it to the deck of the Sandmate. The "lashing" was a bit unusual—double 1 3/8-inch tie rods fitted into a forked plate at the top of the panel and a special clip down at the ship's gunnel bar. The divers placed the double rods every 22 inches along the length of the cofferdam. Men above swung wrenches on the tightening bolts, drawing the panels firmly down against the ship deck. They placed each panel in this manner, working from the stern up to the bow. When the last side panels were in place the difference in length at the bow was less than 2 inches.

Patching the Holes

During the times they could be spared from installing the cofferdam, the divers worked on the holes in the ship hull. There were seven separate holes in the starboard side of the ship.

(Concluded on next page)



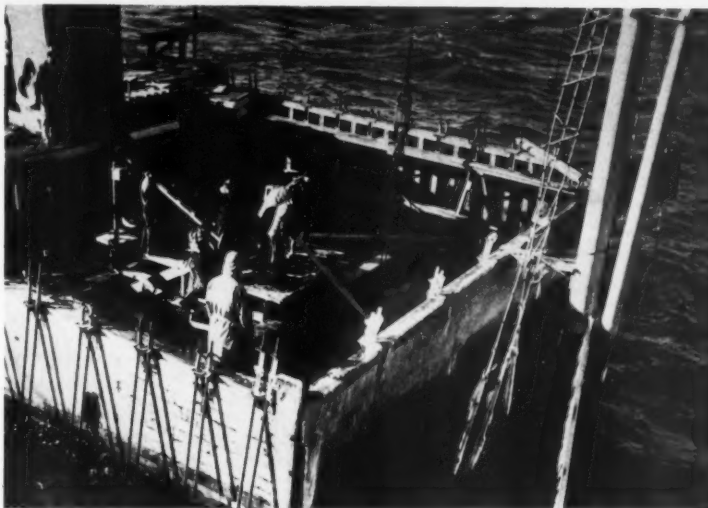
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Each was repaired with carefully made up patches of canvas-covered soft rubber backed by 1/2-inch steel plate. The divers also closed up the small openings in the deck which lay outside the cofferdam. All of this work was done through the winter, and the icy decks, lines, and ship sides were a constant hazard.

Pumping 'Er Dry

The last phase of the salvage was pumping out the water. CAC tenders brought ten heavy-duty diesel-powered 6-inch wellpoint pumps out to the sunken ship. The derrick swung them onto decking placed inside the cofferdam and they were ready to go into action.

Pumping started on a falling tide. Just a couple of the pumps kept the water inside the cofferdam dropping as fast as the tide fell outside. When the water reached slack tide, all the pumps revved up and started pulling the water out at a rate of about 1,000 tons per hour. By the time the tide had



C. & E. M. Photo

This closeup of the cofferdam shows the tie-rod lashing and the ice that made the work of salvaging the Sandmate difficult and hazardous.

swung and was starting to rise, the Sandmate had sluggishly broken water. Some additional temporary repairs were made then, and a few days later she was towed to the Bethlehem Steel Shipyard in Brooklyn to be cleaned and refitted for future service.

Personnel

It was a fast job all along the way. Salvage of the \$3,000,000 vessel was accomplished in three months. About 30 workmen, plus 5 divers and their tenders, performed the various stages of the recovery.

Roy A. Brinkman, Vice President, and Paul H. Blair, Naval Architect, developed the salvage method on this job. George Sensibar was CAC's General Superintendent; Walter Russell was Salvage Master. Designs for the conversion of the Sandmate and two other sea-going dredges owned by the company were developed by J. R. Sensibar, President of Construction Aggregates Corp.

Pennsylvania Turnpike

Shows Accident Decrease

There has been a marked decrease in fatalities and accidents on the Pennsylvania Turnpike. The 1951 figures, as against those for 1950, lead the Turnpike Commission to conclude that there has been more careful and intelligent driving on the part of the majority of drivers, and especially commercial-vehicle operators. The Commission also attributes good results to more attentive and diligent efforts on the part of the police patrols and safety engineers of many of the commercial fleets using the system.

Some statistics are as follows: The 1951 traveled mileage on the Turnpike increased 62.7 per cent, while the fatality rate decreased 31.5 per cent; 1951's fatality rate was 8.5, compared to 12.4 in 1950. As regards fatal accidents, the 1951 rate was 6.1, compared to 8.8 in 1950—a decrease of 30.7 per cent; 1951 fatalities were 66 in 774,215,981 miles of travel, compared to 59 in 475,980,605 miles traveled in 1950. The number of vehicles using the Turnpike in 1951 totaled 7,777,508—an increase of 3,003,140 over the 1950 total of 4,774,368 vehicles, or a percentage increase of 62.9. As to accidents involving injuries, the 1951 decrease was 8.7; there was a 4 per cent decrease for persons injured and a 5 per cent decrease for property damage. An interesting point is that, of the 1951 fatalities, 57 per cent occurred in the daytime while 43 per cent occurred after dark—almost an exact duplication of the 1950 report.

Chairman Thomas J. Evans, summing up the report for the Commission, sounded a note of warning when he said: "The Pennsylvania Turnpike system is regarded as near perfection as human minds and hands can make it, but no driver should get the idea that it is accident-proof. No highway could possibly achieve this degree of perfection so long as human hands guide the vehicles that travel over it. So long as the human element is involved it can neither be accident nor foolproof. The Turnpike is just as safe as the drivers who use it."

Data on Line of Altimeters

A catalog on sensitive altimeters is available from Wallace & Tiernan Products, Inc., Mill and Main Sts., Belleville 9, N. J. The company claims its three models will obtain vertical control in one-tenth the time of ordinary surveying technique.

Features include self-balance, easy-to-read graduations, and shockproof cases. The units are made to suit a number of ranges, and are accurate to 1 in 1,000.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 116.

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for Atlas Constructors, New York, N. Y.

9

for Los Angeles County, Cal.

7

for J. A. Jones Construction Co., Charlotte, N. C.

Ask the fleet owners!

It's a sure sign of satisfactory performance when customers make repeat purchases again and again as they do with "PAYLOADERS" . . . sure proof that it pays to buy a tractor-shovel designed and built as a complete unit specifically for tractor-shovel service.

It's the kind of satisfactory performance you too can expect when a "PAYLOADER" is on your job. It's the finest equipment investment you can make — the most versatile machine on your equipment roster . . . the only tractor-shovel with more than 32 years of bulk material handling experience behind it.

"PAYLOADERS" are tops in the field — and they're backed by a world wide network of top flight distributors with complete parts stocks and the finest of service facilities . . . to keep your jobs moving wherever they may be.

The "PAYLOADER" is available in eight sizes with bucket capacities from 12 cu. ft. to 1 1/2 cu. yd. — and with a choice of front wheel drive, rear wheel drive or four wheel drive models to best fit your needs. The Frank G. Hough Co., 762 Sunnyside Avenue, Libertyville, Illinois.

WRITE for the name of your Hough Distributor and literature on any of these "PAYLOADERS": 4-wheel-drive Models HM 1 1/2-yd. or HR 1-yd., Rear-wheel-drive Models HY 1 1/4-yd., HF 3/4-yd. or HE 1/2-yd., Front-wheel drive Models HAH 15 cu. ft. or HA 12 cu. ft.



PAYLOADER®

THE FRANK G. HOUGH CO.

SINCE 1920



Plant Capacity High Travel Weight Low

An addition to the 880 Gravelmaster Series of portable crushing, screening, and loading plants is announced by Universal Engineering Corp., Division of Pettibone Mulliken Corp., 620 C Ave., N. W. Cedar Rapids, Iowa. The 880 Senior R incorporates new engineering developments to increase capacity yet keep traveling weight within state highway limitations.

The plant features a 10 x 36-inch roller-bearing jaw crusher, a star-gear roller-bearing roll crusher with a 30-inch diameter x 22-inch face, and a 4 x 10-inch 2½-deck inclined gyrating screen. The plant is driven by a single 115-125-hp power unit mounted on it, or by a separate side drive through a universal joint connection from separate truck-mounted power.

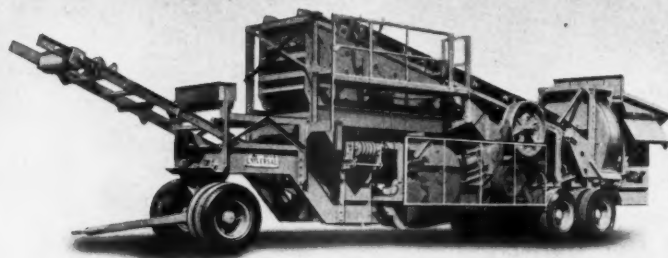
The 880 Senior R can be fed by shovel, truck, or dragline direct from pit to hopper or with an optional 180-degree-swivel feed conveyor. It also can be combined with a Universal 546P primary for quarry operations. With the new model, the 880 Gravelmaster is now available in six standard two-stage gravel plants, in capacities from 75 to 270 tons per hour.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 135.

New Book on Arc Welding

Complete information on all major phases of arc welding is presented in a new 544-page book. "Modern Arc Welding" can be used by students as a beginner's course, and by engineers, operators and designers as a guide to better welding.

Part 1 discusses the development of arc welding, and describes applications, available materials and alloys, joints and welds, electrodes, equipment, costs, and personnel. A thorough operator-training course is given in Part 2. Review summaries, exercises, and actual quiz questions test the reader's knowledge of welding joints, light-gage sheets, pipes, and cast iron. Training is



The Senior R rounds out the 880 Gravelmaster Series of portable crushing, screening, and loading plants made by Universal Engineering Corp.

also given in starting and manipulating the arc and welding with coated electrodes.

Part 3 covers the principles and procedures of carbon arc welding. A section on the long-arc method is included. Inert-gas-shielded arc welding, submerged arc welding, and electric

stud welding are discussed in Part 4. Welding terms, standard definitions, and general information tables are included in the final section.

The book has 28 chapters and is illustrated with over 600 photographs, diagrams, and charts. It is priced at \$3.00 and can be purchased from Hobart

Trade School, Hobart Square, Troy, Ohio.

U. S. Rubber Co. Personnel

United States Rubber Co., New York, N. Y., announces personnel changes in two of its divisions.

In the Mechanical Goods Division, Harry M. Frecker, formerly Development Manager for the Passaic plant, is the newly appointed Manager of Commodity Sales. In his new position Mr. Frecker will have direct charge of all commodity-sales departments for such mechanical rubber goods as conveyor and elevator belting, V-belts, and transmission belts. He is a veteran of 30 years' service with the company.

In the Naugatuck Chemical Division, Gerald L. Dennis, formerly Technical Sales Representative in the Philadelphia area, is Branch Manager of west-coast operations. Mr. Dennis, who will make his headquarters in Los Angeles, Calif., succeeds J. Raymond Morath, who died earlier this year.

More speed on new highway—with TIMKEN® bearings in scraper and tractors

THE three Caterpillar units below are working on the relocation of U.S. Highway 50 near Guysville, Ohio. In all three units—DW21 tractor (pulling), 21 scraper, and D8 tractor (pushing)—vital moving parts are mounted on Timken® tapered roller bearings.

With Timken bearings in this equipment, the contractor has extra insurance that the job will keep moving along on time. Timken bearings make closures more effective

by keeping shafts concentric with housings; dirt and dust stay out, lubricant stays in. Timken bearings take heavy shock loads with capacity to spare. Due to smooth surface finish and case-hardened bearing surfaces, wear within Timken bearings is negligible. Since Timken bearings take both radial and thrust loads, they hold related parts in proper alignment, preventing wear.

As a result, time out for maintenance and repair of equipment is

minimized. The machines stay on the job.

The construction equipment you build or buy should have the advantages that Timken bearings make possible. Be sure its bearings carry the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best.



CATERPILLAR TRACTOR CO. mounts the DW21 tractor, 21 scraper and D8 tractor on Timken bearings for smooth, dependable performance.

MORE CONCRETE BREAKAGE Less man hours!

with SABUR POINT

(Reg. U. S. pat. off.)

COMPARATIVE PERFORMANCES OF SABUR POINT AND CONVENTIONAL POINT

Conventional Moll Point



Tools begin breaking concrete.

Two inches into concrete. The conventional moll point ends its breaking action. SABUR Point's unique wedge-action continues to shatter concrete.



Six inches in. Conventional moll point is simply cutting a hole. The SABUR Point continues its breaking. Wedge-action permits tool to continue its penetration with point riding free. Stays sharper 3 to 5 times longer than conventional tool. Will shear reinforced mesh, where ordinary moll point hangs up.

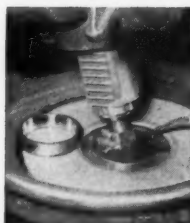


ROCK BIT
SALES AND SERVICE CO.

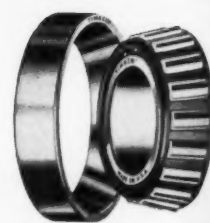
Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa. • 350 Depot St., Asheville, N. C.
A complete line of accessories for pneumatic tools

FINISHED TO CLOSER TOLERANCES

Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company. The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.



TIMKEN
TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



This new Dandie concrete mixer has a 3½-cubic-foot capacity.

New Concrete Mixer

A 3½-cubic-foot concrete mixer with a tilting-type end-discharge drum is announced by the Kwik-Mix Co., Port Washington, Wis. It has an unmixed-material capacity of 5½ cubic feet.

The Dandie is 41 inches long, 65 inches high, and has a 43-inch shoveling height and a 25-inch discharge height. The all-welded steel drum, 30½ inches deep and 30 inches wide, is supported on a box-section yoke.

Other features include power transmission by multiple V-belt, a positive tilting device, and a tow pole that balances the mixer for moving. A new locking device holds the tow pole in its socket to prevent sway while traveling at high speeds. Power is supplied by a single-cylinder air-cooled gasoline engine.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 106.

Two Catalogs on Ditchers

Two new catalogs describing the Buckeye Models 314 and 303 wheel-type ditchers are offered by Gar Wood Industries, Inc., Wayne, Mich.

The Model 314 catalog explains in detail the construction and operation of this pipeline and utility ditcher. Features cited include a fluid coupling for efficient power transmission, long service life through cushioning of shock, hydraulic digging-wheel hoist, one-piece digging rims with variable bucket spacing, flexible-type gear traction drive, and a transmission that provides 8 forward and 2 reverse digging speeds, 4 roading and 6 conveyor-belt speeds.

The other catalog features the easy operation and efficient power transmission of the Model 303 medium utility ditcher. Like the 314, the Buckeye 303 has a split torque-type conveyor drive and a one-piece digging rim designed for variable bucket spacing. Both catalogs present 2-page side views of the ditchers which clearly point out and explain important parts and functions. They also include complete specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 145.

Booklet on Testing Services

Testing services for construction are described in a booklet issued by United States Testing Co., Inc., 1415 Park Ave., Hoboken, N. J. The company tests and inspects steel, concrete, soils, pipe, wood, asphalt, paints, and similar products.

Steel inspection covers mill and shop work, erection, and welding. On concrete work the company not only designs the mixes but carries the testing and inspection through all stages of construction.

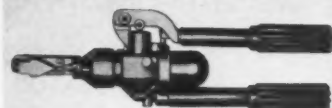
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 113.

Self-Propelled Compressor

A catalog on self-propelled air compressors has been released by Schramm, Inc., West Chester, Pa. It shows how the Pneumatractor not only provides air from a 105-cubic-foot compressor but also pushes, pulls, and supplies power to a number of attachments.

Air attachments are made for drilling rock, driving piles and posts, spading, breaking pavement, and sawing. Front-end accessories include earth and snow buckets, backfill and bulldozer blades, booms, platform scaffolds, and winches. Augers, sweepers, mowers, and backhoe attachments are also available.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 250.



The Model 200-A Guillotine hydraulic cutter snips ½-inch reinforcing rod. It weighs 12 pounds.

Unit Cuts ½-Inch Rod

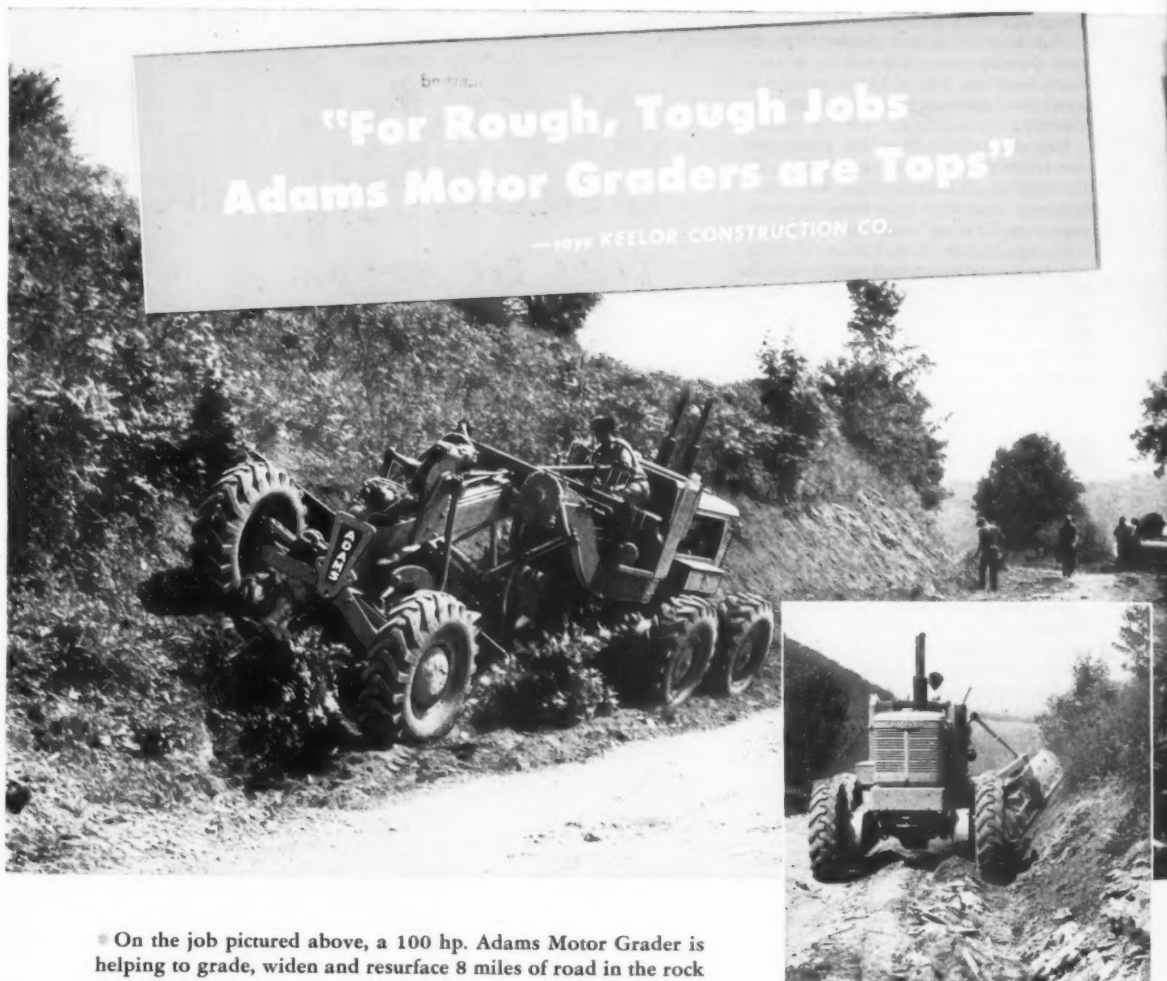
A hand-operated hydraulic cutter that snips ½-inch reinforcing rods is announced by The Manco Mfg. Co., Bradley, Ill. The Model 200-A weighs 12 pounds and is 21 inches long. A dual ratio pump develops 8,500 psi which exerts a 10-ton thrust at the

steel blades. The company points out that the simplicity of design reduces twisting, the major cause of blade breakage.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 249.

Kidd Is V. P., Sales Mgr.

Henry M. Kidd, Sales Manager of the Spray Painting Equipment Division of DeVilbiss Co., Toledo, Ohio, was recently elected Vice President in addition to his post as Sales Manager of the Division. Mr. Kidd, who has been with DeVilbiss for more than 18 years, worked in every department of the plant while in sales training.



"For Rough, Tough Jobs
Adams Motor Graders are Tops"

—JOHN KEELOR CONSTRUCTION CO.

On the job pictured above, a 100 hp. Adams Motor Grader is helping to grade, widen and resurface 8 miles of road in the rock area of Pennsylvania—than which there is none rougher or tougher.

Keelor Construction Company, owner of this machine, says, "We consider Adams the best motor grader on the market, as evidenced by our recent purchase of another one of these big machines. Not only does its 100 hp. high-torque diesel engine have the lugging ability to handle roughest, toughest work, the whole machine has exceptional strength and stamina."

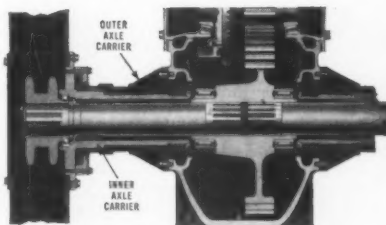
Performance like this is typical of all Adams Motor Graders, making them first choice of more and more contractors and highway officials. All models—from largest to smallest—offer such important advantages as 8 Overlapping Forward Speeds • High Arch Front Axle • Positive Mechanical Controls • Wide Range of Blade Adjustments • and many others.

Ask your local Adams dealer to demonstrate how these great machines will step up operations and cut costs—for you!

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA



ADAMS FULL-FLOATING REAR AXLE



In all Adams Motor Graders rear-end weight is borne entirely by heavy inner and outer axle carriers. The axle serves only to drive the machine—is not subject to the shocks and stresses that cause most axle failures in other graders.

Make your next
motor grader an



Roadside Development Short Course in La.

Third Annual Conference Attended
By Representatives from 10 States;
Many Roadside Problems Discussed

By TORBERT SLACK,

Roadside Development Engineer,
Louisiana Department of Highways

• LOUISIANA held its Third Annual Short Course on Roadside Development in Baton Rouge, March 11-14. It was sponsored by the Louisiana Department of Highways, Louisiana State University, and the Bureau of Public Roads. Two days were devoted to papers and discussions of various phases of roadside development, followed by a two-day inspection trip of the roadways in northern Louisiana and southern Mississippi.

Representatives from ten states and the District of Columbia attended. Of the total of 146 registrants it was gratifying to note that 102 were highway engineers, 14 were landscape engineers, landscape architects, and others directly and indirectly connected with roadside development in their respective states or with the Federal Government; 30 were specialists, organization and club members, nurserymen, industry and land owners interested in roadways. Such a display of interest by the engineering profession—particularly highway engineers—indicates the general interest in roadside development. It shows, too, that such meetings can be informative to both highway department personnel and the public, and that roadside development can be made one of a highway department's best public-relations media.

The program of technical papers was planned to cover the design, construction, and maintenance phases of roadside development; to outline an organization for roadside development personnel within a highway department; to stress roadside development's public-relations value; and to report on what other states are accomplishing in roadside development.

First-Day Sessions

Presiding at the opening session was Torbert Slack, Roadside Development Engineer of the Louisiana Department of Highways. Major Fred C. Frey, Dean of Louisiana State University, and R. B. Richardson, Director of the Department of Highways, welcomed the group and commented on the value of such meetings.

"Public Relations Through a Complete Highway Roadside Program" was the title of the first paper, presented by Wilbur H. Simonson, Chief, Roadside Section, Bureau of Public Roads, Washington, D. C. "The need for order and stability of the highway as a whole is now much better understood and more widely recognized among the states," he pointed out. Dovetailing the complete development of roadway and roadside in highway programs will go far in providing better roads for better living and in furthering good relations with the public, said Mr. Simonson. He stressed that it is important to protect highway right-of-way from undesirable encroachments; that grading, drainage, and erosion control go hand in hand; and that highway design and construction can aid soil and water conservation. He spoke of parking turnouts and rest areas; the reasons why small picnic areas are popular with tourists; and of the importance of coordinating highway right-of-way and abutting-property development.

Dallas D. Dupre, Jr., former Chief Landscape Architect, Ohio Department of Highways (now retired from highway work), made suggestions for the proper

organization of roadside development personnel within a highway department. He cited the 1947 report of the Highway Research Board Committee on Roadside Development and the recommendations of the Committee on Education of which he was Chairman. Among these recommendations was one that the head of the division of roadside development should be responsible to the director or commissioner of highways.

J. F. Tribble, Assistant Construction Engineer, Alabama Highway Department, presided at the second session. During it, Dr. John Monteith, Jr., Turfing Consultant of Washington, D. C., warned against allowing roadsides or other areas to remain bare of turf. Seeding and sodding should be done at

the time of construction, he said—not as an afterthought long after a highway is completed.

Prof. B. H. Singletary, Head of the Division of Horticulture, LSU, discussed trees and what they mean to roadsides. They have other uses than ornamental, he said, citing statistics on the amount of water taken up by tree root systems and given off through leaves. In Professor Singletary's judgment, trees may have a considerable drying effect on both subsoil and surface soil, thus decreasing the amount of drainage required.

F. W. Sayers, Senior Maintenance Engineer of the Missouri Highway Department, described his state's methods of roadside development. Mr. Sayers has been in charge of Missouri's road-

side development program for many years, and he spoke of some of the things learned by experience. Among them is the inadvisability of much roadside planting near entrances to communities. Town and city limits are constantly being extended, and the plantings are usually eradicated in the process. Installation of telephone power, and rural electrification lines is taking the biggest toll of trees, along both the highway and adjoining lands, he reported. Mr. Sayers also showed a film of the dedication of one of Missouri's roadside parks, the first one of which was built in 1927.

E. N. Rodgers, Engineer-Manager of the Alabama Road Builders' Association, was the main speaker at the dinner

(Continued on next page)

Blazin' Up the Blue Ridge

**TD-24s rip up 35,000 yards of rock that otherwise
would have needed blasting**



PUSHOVER FOR THE CHAMP. The toughest work comes easy for the Big Red TD-24. This great International crawler digs in with 148 maximum drawbar horsepower—the most of any crawler on the market.

It was rough work to build a modern road from Charlotte, N. C., to the cool resorts along the Skyline Drive, atop the famous Blue Ridge Mountains.

One cut and fill followed another—and one cut alone was 110 feet deep in solid rock.

That's where Macon Construction Company dug out 93,000 cubic yards of rock, and instead of blasting it all, they were able to doze and rip out 35,000 yards with two big red International TD-24 crawlers.

"We have rock here that you couldn't touch with a dozer, till the TD-24 came along," says ripper operator Roy Cantrell. "Now we blade where we couldn't scratch before, and the ripper tears up rock that used to need blasting."

And dozer operator Jess Leatherwood adds, "My TD-24 pushes more, moves faster and handles easier than any other tractor—and I've run 'em all!"

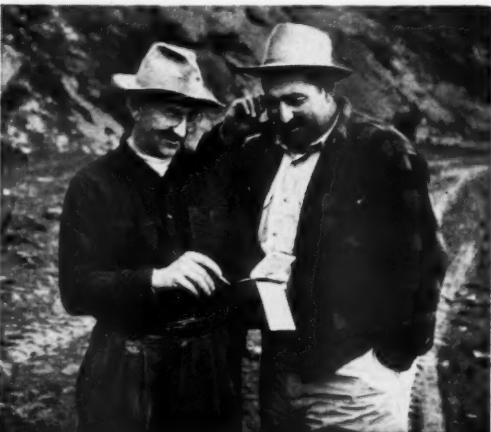
Get complete details on TD-24 capabilities from your International Industrial Distributor... and you'll be a TD-24 man yourself from then on in!

**INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS**



INTERNATIONAL

POWER THAT PAYS



HAPPY CONTRACTORS Allan Siler and Fred Moore. As Mr. Moore says, "There are two ways to move rock: this way and by blasting. Our TD-24s saved us a lot of money, working rock loose long after every other tractor was through."



meeting. Mr. Rodgers spoke of the contribution highways make in the lives of all of us, and stressed the many useful purposes of roadside development. It should, he said, have its beginning on the drafting board as an integral part of the highway construction program. He also commented pertinently on the changed conditions of American firesides, private enterprise, and patriotism.

Second-Dry Sessions

R. T. Goodpasture, Roadside Development Engineer in Tennessee, presided over the morning session on the second day.

First speaker was Dr. David R. Levin, Chief, Land Studies Section, Bureau of Public Roads, Washington, D. C., whose

subject was "Common Sense in Right-of-Way Protection".

Dr. Levin pointed out that while many aspects of our living are being altered, street and highway right-of-way has remained relatively inflexible. He said that this relative inflexibility creates many difficulties for the highway engineer who seeks to modernize the main highway system of another era. "Upon reconnaissance, he finds many physical and functional encroachments upon the movements of large volumes of motorized vehicles. He finds that right-of-ways are too narrow; that too many entrances and exits to abutting property exist, of an inappropriate design and in poor locations; that public utilities along the highways pose problems. He finds

that structures and billboards frequently are encroaching upon the highway right-of-way. The highway engineer also finds that though certain state laws exist that protect the public interest, such laws are not always respected as they might be. He finds that public relations in all these matters are of cardinal importance."

Speaking on roadside development and public relations, he had this to say: "In roadside-protection activities of the past, the fact has been almost wholly ignored that roadside improvement is beneficial, more often than not, to the owner of abutting property as well as to the highway traveler and the public at large. Here is a public-relations approach that can pay off handsomely in more effective roadside protection

than would otherwise be possible."

A highway administrator's view of roadside development was stated by Charles E. Shumate, Administrative Engineer of the Colorado State Highway Department. Mr. Shumate briefly reviewed the progress of highway construction since the advent of the automobile. About 20 years ago the Bureau of Public Roads took the initial step in what is commonly known as "roadside development" today. This, he said, is worth recalling "if for no other reason than to refresh our minds that the roadside problem was actually the last feature of highway design to be given any serious consideration". Mr. Shumate outlined Colorado's program of roadside development and in conclusion said: "Those of us who know so well the value of roadside development, I believe, should keep foremost in our minds the economies involved in our roadside development program, insisting upon those features which we know are most essential for the completed design of the highway, and avoiding proposals which are so elaborate in their scope as to bring criticism upon the entire program, and thus jeopardize those features of roadside development which are so essential to proper highway design and construction."

The General Motors film "Let's Get Out of the Muddle" was presented by W. H. Huckaby, Louisiana's Maintenance Engineer. Mr. Huckaby commented, "The lack of knowledge on the part of the general public, the man in the streets, and even the highway users, is amazing. This lack of knowledge and understanding causes highway engineers and officials to be the most severely, and often unjustly, criticized public servants connected with our government. The greater portion of our people and many of our engineers never leave the confines of their respective states; therefore, they do not know that problems which exist locally are to be found throughout the entire U. S. A." He added, "If every person interested in highway development could see this film, the problems of the various highway departments would become the easier to solve."

Presiding officer at the final session, at which soils were discussed, was A. E. Holmes, Landscape Engineer of the Mississippi Highway Department.

Dr. C. E. Scarsbrook, Associate Agronomist, LSU, outlined the requirements of soil structure to permit proper plant growth. He illustrated his talk with drawings showing how and why various types of soil structure influence growth; how changes in structure are accomplished; why some types retain moisture better than others; and in general which soils are best suited to plant growth. He also discussed humus and commercial fertilizers, their uses and applications.

W. G. Colter, of Monsanto Chemical Co., St. Louis, Mo., gave a film-illustrated lecture on the use of Krilium for erosion control along highways. Mr. Colter explained the use of Krilium for roadside work, especially on slopes. The film showed the experiments that demonstrated how Krilium reconditions soil to retain more water and to allow more moisture to enter the subsoil.

Arrangements have been made with Monsanto for some experiments with Krilium to be carried out in Louisiana, in cooperation with the Roadside Development Engineer of the Louisiana Department of Highways.

Coordinators' Meeting

An extra activity of the general sessions was a meeting of the HRB-AASHO Coordinators, along with other highway and landscape engineers. Four coordinators were present—A. E. Holmes, Division 3; Franklin T. Rose, Division 5 S; Charles E. Shumate, Division 9; and Torbert Slack, Division 6. Mr. Slack served as chairman.

(Concluded on next page, col. 2)

with BIG RED



THE WINNING TEAM. "Deep down in the cut, it seemed every night would be the end of our ripping," says co-owner Fred Moore, "but the TD-24s kept right on going, showing how you can handle rock when you've got top power and traction."





Weights provided by the Rollpac roller vary from 870 pounds to 1,725 with water or 2,100 with sand.

New One-Ton Roller

A new one-ton power roller is announced by Soilaire Industries, 1200 Second Ave., S., Minneapolis 3, Minn. Powered by a 5-hp Briggs & Stratton engine, the Rollpac is built entirely of steel channels and plates. The hollow front roll is made in two sections and measures 18 x 28 inches. The 22 x 30 rear wheel of 3/16-inch plate gives the unit a 44-inch wheelbase.

A Twin Disc clutch with a Toro planetary transmission provides forward, reverse, and brake, all integrally mounted on the universal shaft. Both the engine and transmission are on a separate platform for easy overhauling. The seat can be positioned for forward or reverse steering.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 119

Roadside Development Short Course in La.

(Continued from preceding page)

and various phases and problems of roadside development were discussed.

Inspection Trip

An interesting two-day inspection trip took a group over Louisiana highways north of Baton Rouge and through the cooperation of A. E. Holmes and his associates in Mississippi—into the southern part of that state. In addition to roads and roadsides, many points of historical and sight-seeing interest were visited, including some of the famous ante-bellum homes in Natchez, Miss., and eastern Louisiana.

Among the latter was Oakley Plantation in West Feliciana Parish, where John James Audubon, the great naturalist and painter, lived and did much of his work. The Louisiana Parks Commission is now developing Oakley Plantation and the old home into an Audubon Memorial State Park.

Bin-Level Indicators

A 20-page catalog about bin-level indicators is offered by The Bin-Dicator Co., 13946-54 Kercheval, Detroit 15, Mich. It supplies complete installation data: for thin or thick-walled bins, for inside or outside location, and for suspended interior installation.

Bin-Dicators are equipped with a mercury switch, a sensitive Micro switch for light materials, or an explosion-proof Micro switch for use in hazardous locations. The catalog includes many wiring diagrams helpful to installation and maintenance crews.

It also describes the Bin-Flo aerator unit for introducing low-pressure air into dry, finely ground materials which tend to pack and bridge, and thus restore their fluid characteristics.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 129.

Engineering-Firm Partners

Walter S. Douglas and Alfred Hedefine have been made partners in the consulting-engineering firm of Parsons, Brinckerhoff, Hall & Macdonald, New York, N. Y. Mr. Douglas has been with the firm since 1937, and Mr. Hedefine since 1936.

DAREX AEA
... the world's most widely used
AIR ENTRAINING AGENT
MAKES MORE
DURABLE CONCRETE!



DAREX AEA contains a catalyst which makes available more of the inherent strength of portland cement. This minimizes or prevents any loss in strength resulting from entrained air... makes lean mixes stronger than plain concrete!

Equally important, concrete made with DAREX AEA places easier and faster, finishes better, has better surface texture, is many times more durable when exposed to freezing and thawing.

Readymix concrete plants everywhere can furnish concrete made with DAREX AEA. Ask your supplier... or write to us for

20 Page Illustrated Booklet, Now Available

DAREX AEA
was used in all
the concrete in
the 17,000 units
of the vast
Lakewood Park
project in Long
Beach, California.

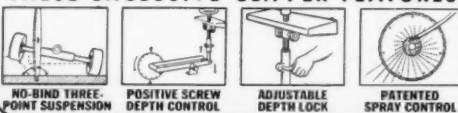
SAW CONCRETE
OR ASPHALT
with **CLIPPER CONCRETE SAWS**
THIS FAST-EASY
ECONOMICAL WAY!

NOW SAW... BEFORE BREAKING! On patches and trenches the removal costs are reduced from 25 to 50% and a minimum of replacement material is poured to straight smooth edges. Hidden fractures are eliminated on all trenches or patches... plus an end to spalling and rough edges and resulting high maintenance costs. Saw CONTRACTION JOINTS too, and stop costly hand forming. The joint lasts indefinitely without spalling.



MODEL C-130

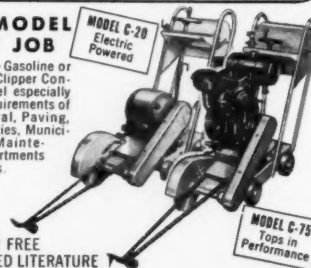
MAXIMUM ECONOMY WITH THESE EXCLUSIVE CLIPPER FEATURES



A CLIPPER MODEL FOR EVERY JOB

Choose from the FIVE—Gasoline or Electrically Powered Clipper Concrete Saws—each model especially designed for the job requirements of Contractors, General, Paving, Roofing, Cement, Utilities, Municipalities, Maintenance Departments or Plumbers.

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ILLUSTRATED LITERATURE



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Clipper

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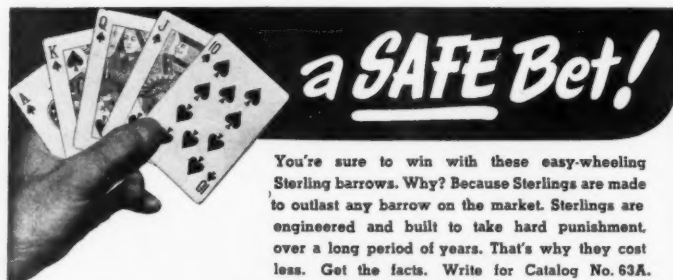
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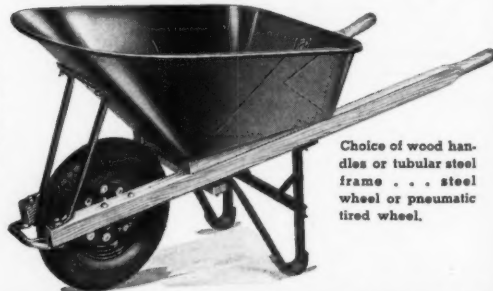
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You're sure to win with these easy-wheeling Sterling barrows. Why? Because Sterlings are made to outlast any barrow on the market. Sterlings are engineered and built to take hard punishment, over a long period of years. That's why they cost less. Get the facts. Write for Catalog No. 63A.

STERLING C5W

Maximum capacity 5 cu. ft. 16 gauge tray, all-welded, no rivets, double lapped at corners. Heavy-duty malleable wheel guard.



Choice of wood handles or tubular steel frame... steel wheel or pneumatic tired wheel.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Sterling
WHEELBARROWS

Look for this Mark of
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Single-boom operation has caused the Model H all-hydraulic Scoopmobile to be christened "the one-armed bandit".

Front-End Loader

A new all-hydraulic Scoopmobile, the Model H, has been announced by Mixermobile Manufacturers, 8027 N. E. Killingsworth St., Portland, Oreg. It has single-boom operation, a 3/4-yard scoop, a rated lift capacity of 4,000 pounds, and a standard discharge height of 8 feet. Vickers hydraulic steering combined with Mixermobile planetary drive is designed to give the Model H maneuverability and power.

The company claims that an efficient operator can handle up to 120 yards of bulk material per hour with the new model. The machine is also used for leveling and backfilling. The operator has full vision from a safe, completely enclosed cab. Attachments available include a swivel-type concrete hopper, lift forks, and a crane boom.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 248.

Prefabricated-Form System

A forming system using prefabricated wood panels and removable tapered tie rods is illustrated in booklets prepared by Rocform Corp., 15160 W. Eight Mile Road, Detroit 35, Mich. The panels are supported by three wooden studs and two permanent aluminum wales. They are held together by special clamps which fit on the wales, forming a con-

tinuous band around the forms. After the concrete sets, the tapered tie rods are removed with a special puller.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 114.

Marion Elects President

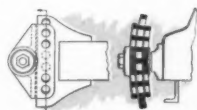
John P. Courtright was elected President at the annual meeting last April of Marion Power Shovel Co., Marion, Ohio, manufacturer of power shovels, draglines, and other construction equipment. He succeeds Harvey T. Gracely, forced by illness to assume an inactive status.

Other new officers are: Adrien F. Busick, Jr., Vice President in Charge of Engineering; and Maurice V. Cornell, Vice President in Charge of Sales. David E. Rizor was named Assistant to the President in matters pertaining to sales and service; and J. Malcolm Strelitz, Marion attorney and industrialist, was elected Chairman of the Board.



A distinguished veteran of World War II, "The Spirit of Cedar Rapids", produces gravel for a supply road up Little Gibraltar Hill, Korea. The crusher was given to the Army in 1943 by Iowa Mfg. Co. and Iowa employees, who made it in 24 hours as a memorial to the company's first employee to die on active service.

Another reason why BAKER is the BETTER blade



Baker Blades are designed not only for peak flexibility, but for rigidity. With up to 12 inches of tilt available in five positions, the operator simply adjusts the frame at the trunnion brackets by shifting two pins. Also, adjustments are made on an arc movement which provide full bearing contact in all positions.

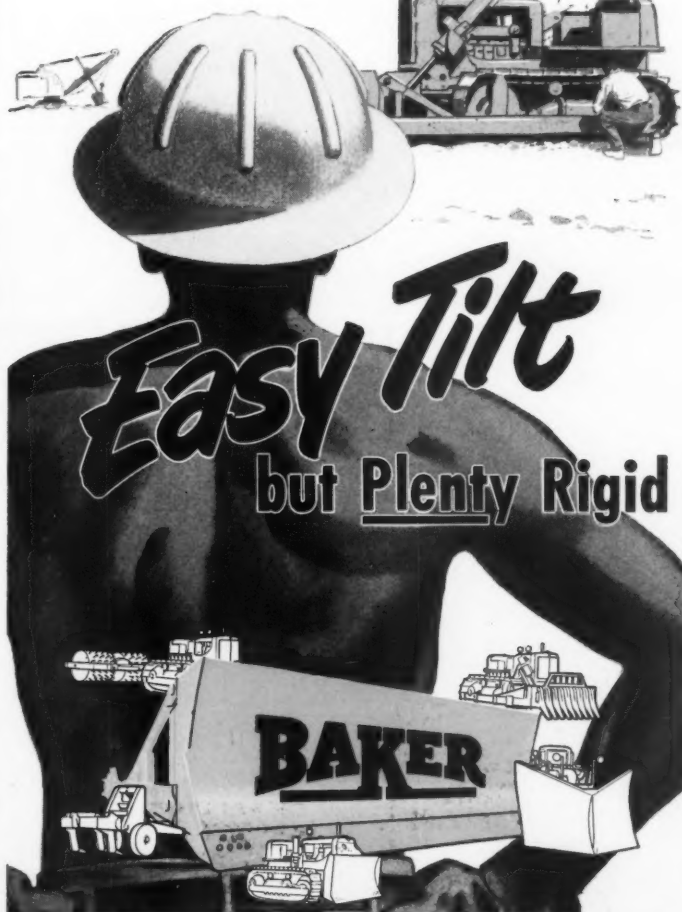
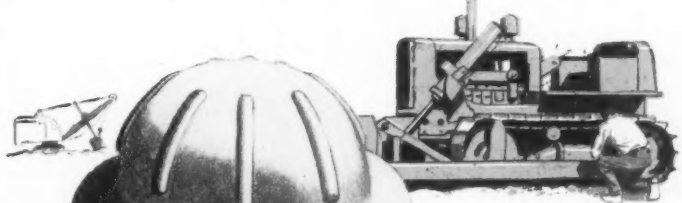
That's why owners and operators say Baker Blades will take a beating and stay solid—without developing "play" or shimmy.

The complete line of Baker Bulldozers, Graders, and Root

Rippers—all easily interchangeable, too—is manufactured exclusively for Allis-Chalmers Crawler Tractors. Three mountings are available: engine-mounted hydraulic, frame-mounted hydraulic (the revolutionary 9-X "No Push Beam" Dozer) and cable-controlled types.

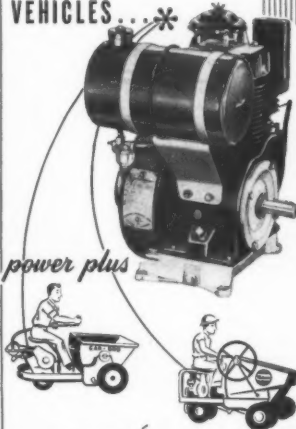
Call or write your Baker, A-C Dealer today—ask for proof why Baker is the better blade—dollar-wise—for you.

THE BAKER MANUFACTURING CO.
Springfield, Illinois



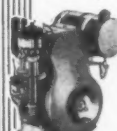
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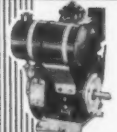


AN OUTSTANDING RECORD OF TROUBLE-FREE PERFORMANCE

"We are using Gladden engines exclusively on our material handling units because of their universally accepted dependability and powerful performance," says the Vice-President of one of the leading manufacturers of material handling units.



MODEL 75-7 H.P.



MODEL 50-5 H.P.



MODEL 40-4 H.P.

Strong, reliable and inexpensive to operate, GLADDEN'S series of single cylinder, air-cooled, pretested engines find real usefulness in every construction application.

FEATURES OF DESIGN

- Timken Main Bearings
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GLADDEN ENGINEERS WILL ADAPT THESE ENGINES TO SPECIAL INSTALLATIONS OR REQUIREMENTS UPON REQUEST...

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"TOPDOG" VIBRATOR

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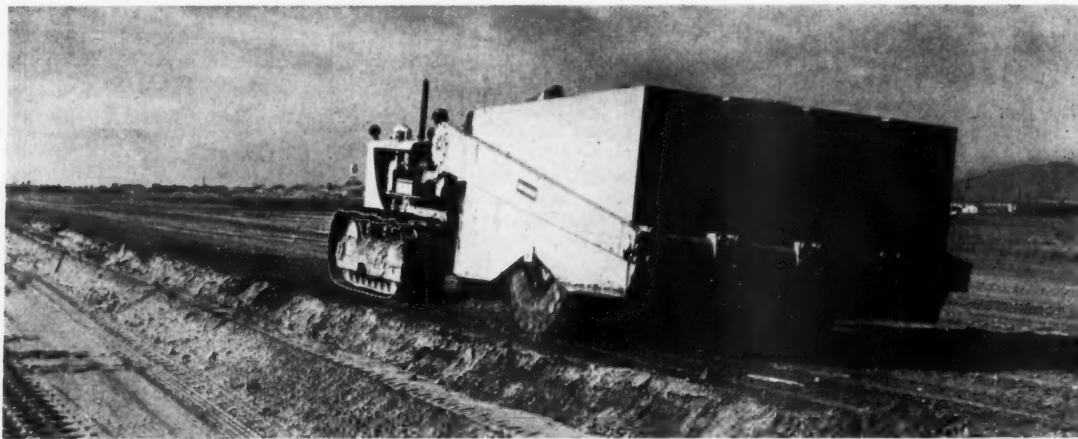
VIBRO-PLUS PRODUCTS INC.

54-11 Queens Blvd., Woodside, L. I.

Bomber Runway and Apron



Heavy grading was the order of the day. Here a LaPlant-Choate scraper and Caterpillar DW20 get pusher help from A-C HD-20's.



Southwest 50-ton compactors helped Peter Kiewit Sons' Co. meet the specifications for 95 per cent (modified AASHTO) earth compaction.



Then an 11-inch layer of decomposed granite went down the runway subgrade and was blade-dressed by two Caterpillar No. 12 graders.



After a 6-inch course of pit-run gravel came 7 inches of dry macadam, with the rock placed by Jaeger spreaders. A Buffalo-Springfield 3-wheel tandem rolled the macadam.



Dense Compaction, Special Base, and Macadam Courses Highlight Huge Expansion of March Air Force Base

By RAY DAY

• AT March Air Force Base near Riverside, Calif., late last fall, a civilian correspondent from one of the local papers paid a call on Peter Kiewit Sons' Co. of Arcadia. The Kiewit organization, as usual, was in high gear and dirt was flying. About \$6,200,000 worth of expansion work was under way for the U. S. Air Force under a Corps of Engineers contract. The reporter, anxious to make his deadline, took one look at what he saw and made a wild guess. When he got back to the office he wrote, "Paving 3 feet thick is being laid at March AFB . . ."

He was wrong, of course. The paving is not 3 feet thick. But the unusual strength of its construction is enough to explain his error.

Expansion work at March AFB includes among other things a new NW-SE runway 10,000 feet long and 200 feet wide, with 1,000 feet of clear zone at each end and 75-foot shoulders on each side. Since it was designed for 100,000-pound wheel loads to accommodate the XB-47 jet bomber, some heavy base work was required. High-density earthwork, processing of decomposed granite and pit-run gravel, and the installation of a special dry macadam base course in two lifts combined to make the base job interesting.

The importance of dependable runways where wheel loads are heavy and frequent could never be exemplified better than at March AFB. March is one of the oldest Air Force bases, and lately its ships have become a part of the Strategic Air Command. The new runway will have to serve with a minimum of maintenance. For that reason, the specifications for its construction were rigid, but not impossible.

First of all, a minimum compaction of 95 per cent, referred to the modified AASHTO method of testing, was required on all earth subgrade under pavement and shoulders. For the runway proper the spec called for 11 inches of decomposed granite, with 1,000 feet at each end thickened to 14 inches. On top of this material came 6 inches of pit-run gravel, and 7 inches of dry macadam built in two lifts. Four inches of plant-mixed asphaltic concrete—a 2½-inch binder and a 1½-inch finish course—completed the paved section.

The clear-zone extensions at each

(Continued on page 56)

Expand Air Force Base

Speedy Installation of PCC Is Reality as Dual Pavers Dump Concrete for Air Base In Southern California

• INCLUDED in the Peter Kiewit Sons' contract at March Air Force Base is a big plane-parking apron 685 feet wide x 3,800 feet long, paved with portland-cement concrete of 15-11-15 design. The paving was somewhat complicated because it had no straight grades, and pavers and forms had to follow up-and-down waves similar to the corrugations in a tin roof. Drainage was the reason for this unusual grade pattern. Over the years the paved areas at the big air base have grown to the point where design engineers have had to come up with some scheme to accelerate rain runoff.

Strength-building features under the concrete paving include 6 inches of 95 per cent compaction in native subgrade soil, and a 6-inch course of compacted decomposed granite, which was placed over the compacted soil for its strength and cushioning effect. Generally speaking, March Field soil is an excellent engineering material, meeting A6 and A7 classifications.

Over most of the plane-parking area, 20 and 25-foot lanes could be laid out. But some of the area blended into small standby islands, which were to be paved later with plant-mix. On some of these transitions there was some handwork, but for the most part the job resolved itself into a high-speed operation.

Forms and Subbase

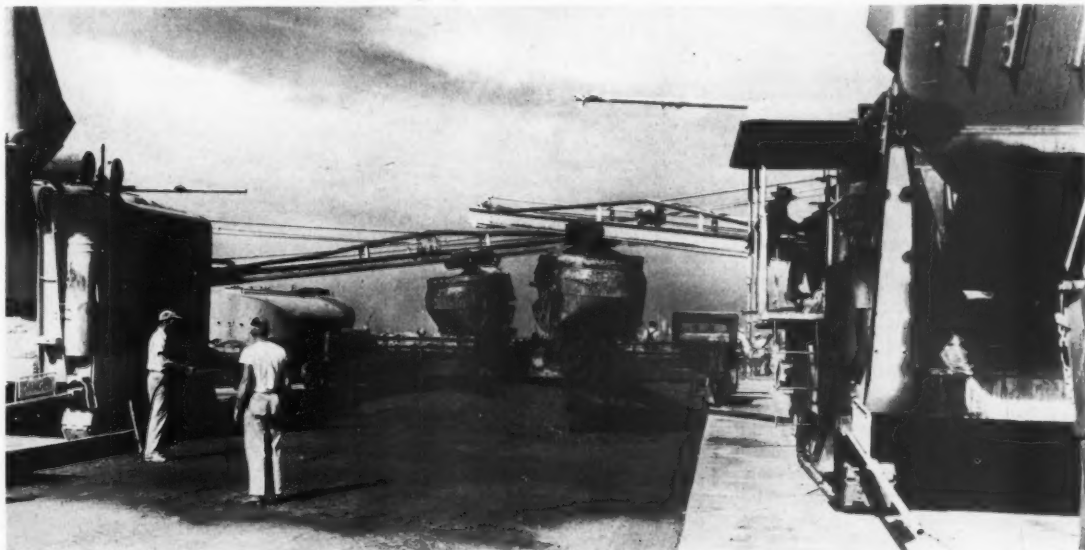
The Kiewit paving organization consisted of a crew under Clark Tope, Paving Superintendent, whose members were used to working together. Realizing that paving output would be high, the Kiewit management brought in Blaw-Knox and Heltzel steel forms, with 8-inch sides. A 3-inch timber, bolted to the base of each form, made the 11-inch pavement dimension. These forms were then set as far ahead of the pavers as possible, depending on ground conditions. Forms were from 1,000 to 7,000 feet ahead of the paving at various times.

The form crew set the heavy sections to a string line and performed the minor hand tamping necessary to give the bases good support. When the forms were in place, a Lewis subgrader handled the fine-grading on 25-foot strips. For 20-foot work, a pull-type planer with a Caterpillar D6 was used.

The excess material from the decomposed-granite subbase was either



Two batch plants—a shop-assembled one, left, and a Noble—were needed to supply the pavers working on the concrete parking apron.



Here are the two Rex 34-E dual-drum pavers, working side by side on the same 25-foot paving strip of the apron.

moved ahead to a low spot or hauled to the nearest island for use in its base. Final compacting was done by a Huber 3-wheel roller ballasted to 10 tons.

The pavement has relatively few joints, and no expansion joints whatever. Longitudinal and transverse contraction joints are provided, however. The 25-foot strips are split by a longitudinal dummy joint of Flex-Plane mastic, $\frac{1}{8} \times 2\frac{3}{4}$ inches, and transverse dummy joints, varying from 15 to 20-foot centers, of the same material.

Paving and Finishing

Pavers consisted of two new Rex 34-E dual-drum machines, with a Koehring 34-E Twinbatch for a standby. When the pavers worked from the

subbase, each dumped its concrete on its half of the lane. When they worked from previously placed concrete, no planking was necessary, because the smooth crawler pads came down flat when they reached the slab.

Mixing water was available on the base, and tank trucks shuttled between the supply hydrants and the pavers. Each paver towed its own water-supply trailer, which was replenished by the supply tanks. Mixing time for the dry batches was one minute.

There were two complete sets of concrete spreaders and finishers, one for 20-foot lanes and one for 25's. Both sets were identical as to make, however, and the lineup was the same in both cases.

Ahead of everything was a laborer

with a sprinkling hose, supplied from the paver tank. This man dampened down the subbase just ahead of concrete placement to rid the area of dust, and to insure a clean deposit of the fresh concrete. After him came the pavers.

Following the pavers was a Jaeger screw-type spreader, which carried edge and surface vibrators to help consolidate the mix. A Jaeger-Lakewood finisher, a Flex-Plane machine, a labor crew with long-handled wood floats and edging tools, and a spray rig for applying membrane curing compound completed the picture.

In spite of the fact that concrete was poured at an extremely high rate, Kiewit's finishing-machine lineup kept

(Concluded on page 62)



Then came labor gangs with brooms to level ridges and work a choker course of crusher dust down into the rock voids—and a Huber 3-wheel roller (in the rear), also wielding a broom.

Runway and Apron For Air Force Base

(Continued from page 54)

end call for the same subgrade compaction, with 500 feet of paved surface on both ends. Four inches of decomposed granite and 1½ inches of plant-mix surfacing comprise that construction. All taxiways get a 14-inch course of decomposed granite, with the same type of upper subbase construction as the runway proper.

The contract includes not only the new runway and taxiways, but also a new portland-cement-concrete parking apron, extensive grading, preliminary pavement demolition, installation of a Government-furnished underground fueling system, finish cleanup, and landscaping. Construction of the portland-cement-concrete apron is treated in the companion article on page 55.

Pavement Demolition First

Before base-course work or even very much grading could get under way, some extensive wrecking had to be done. The area where the new runway and apron were to go in contained a large parking apron, some igloos and revetments, and numerous barracks. The barracks were moved over to Camp Haan, about a mile away, but that still left plenty of pavement demolition ahead.

It was no light job. There was 372,000 square yards of bituminous paving from 2 to 10 inches thick, mostly of plant-mix construction. About 40,000 square yards of tough 9-6-9 portland-cement-concrete lay out in the old apron, and under that in many places was 50,000 square yards of soil-cement 6 inches thick. The only easy part of the demolition job was 42,000 square yards of asphalt emulsion cake—scarifier teeth on Caterpillar No. 12 motor graders were equal to its wrecking.

The heaviest pavement, such as the portland-cement-concrete slabs and some of the heavier bituminous mats, were broken up by a 3,000-pound steel skullcracker, handled by a truck crane. The old slabs were exceptionally tough, and even the soil-cement had retained enormous strength.

Thinner bituminous mats were ripped apart by a special 10-tooth shop-made underslung ripper, mounted underneath the frame of a LeTourneau K-30 Rooter and pulled by a D8. If the mat was exceptionally tough, the underslung instrument was made so that a few teeth could be taken out. If it ripped more easily, all the teeth stayed in to break the mat up into finer pieces.

Broken pavement of all types was then bunched in piles by several D8-mounted Caterpillar dozer blades. An Allis-Chalmers HD-19 fitted with a 4-yard Tracto-Shovel turned out to be an unusually effective loading machine. The demolished pavement was hauled by dump trucks over to the Camp Haan area, across the highway from March AFB, and dumped in a disposal area designated by the Corps of Engineers.

In many respects the pavement demolition was one of the most important items, and no methods were so sure as to guarantee that the ambitious construction schedule could be met. A few mistakes were made, including the assignment of a front-end loader too small to handle the large yardage. The combination of underslung ripper, breaking ball, piling dozers, and the large Tracto-Shovel was a winning one, however, and this work managed to stay ahead of grading.

Grading—775,000 Yards

As March Field was developed in days gone by, the general drainage pitched northward from the south side of the field, which before Kiewit moved in on the present job was the high spot of the area. Major expansion of the runways and paved areas therefore

posed a serious drainage problem. The only way to solve it was to make some heavy grading cuts on the high side of the field, and establish a new system of drainage channels there. It called for the removal of about 775,000 cubic yards of unclassified excavation, some in cuts as deep as 10 feet. Hauls were long, too, to get the dirt over to low spots at the north and east ends of the property.

Grading was handled by two main spreads of equipment: a tractor and scraper fleet, and a group of fast rubber-tired hauling units. The scraper outfit included four LeTourneau Model W Carryalls, and a Model 80 Caterpillar, all pulled by Caterpillar D8's. Two D8's with push blocks were assigned to help load the scrapers in cuts.

The faster long-range fleet was built with 7 LaPlant-Choate motor scrapers, and later on, two Caterpillar DW20's were rented from Johnson Tractor Co. Two Allis-Chalmers HD-20's were assigned to these units for pusher work in the cuts. For a short time a "hot

rod" D8, one with the supercharged engine, also did pusher work. Plenty of pushing equipment was available at all times, on the theory that a pusher tractor more than pays for itself in the bigger loads it invariably produces.

Processing equipment included 4,500-gallon water tank trucks, Caterpillar No. 12 motor graders with 16-foot blades, John Deere and Allis-Chalmers disks, 50-ton Southwest pneumatic compactor rollers, Farmall tractors with Bros Wobble Wheel rollers for finish work, and a monstrous 120-ton test roller owned by the Corps of Engineers. This equipment was split up between the two spreads to handle whatever dirt they poured into the fills.

Although the soil at March AFB is generally excellent, carrying A6 and A7 classifications, the 95 per cent density requirement caused some serious field research, especially at first. Specifications permitted a 6-inch lift. Water was added in the cuts and also on the fills. Thorough diskings, sometimes four or five passes, blended the earth with

its moisture. Then the big 50-ton Southwest compactors would do their job in six passes. If the material was not blended, lower densities resulted.

Many of the 2,225,000 square yards of finished subgrade lay in cut sections. Specifications required this natural ground to be processed also, and developed to the same high density. To get that result, these sections were rooted up by a scarifier to a depth of 6 inches. The proper amount of moisture was then put in by the water tanks. Disks processed the material as they had the fill material, and when a proper blending had been made, the entire lift was rolled. It usually required extra passes in this material to develop the 95 per cent densities.

For a time, as a matter of fact, it was necessary to work an extra 10-hour shift each day on compaction to take care of the yardage being poured in by the grading fleet. It was strictly a high-ball job. The Kiewit organization moved into the field in late June and

(Continued on next page)



No body-hoist

GRAVITY DUMP cuts maintenance costs... speeds haul cycles

Koehring Dumptors have no slow-working body hoists. Trip the release lever and gravity dumps the 6-yard load in one second. It's as simple as that! No complicated mechanical hoists to slow up haul cycles... no expensive replacement parts, costly hoist maintenance or down time to eat into your profits. And gravity dump is instantaneous and trouble-free in all temperature extremes... never wears out.

No costly spring maintenance is another

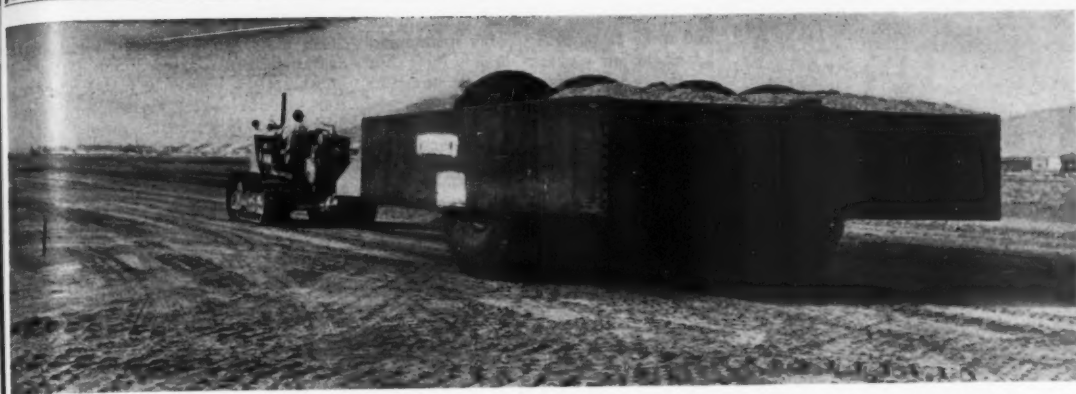
money-saving advantage you get with Koehring Dumptors. There is just one big, double-coil chassis spring on steering axle... none on driving axle. Extra-big, shock-absorbing drive tires eliminate need for more. You save spring maintenance time and replacement costs.

Check your body hoist and spring maintenance costs for a year... see how much you'll save by using Dumptors. What's more, Dumptor's no-turn shuttle haul and constant-mesh transmission for 3-speed travel forward and reverse, increases production... and your profits. See your Koehring distributor now for all the facts... or send today for informative 28-page Dumptor catalog.

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KOEHRING DUMPTOR
CRANES UP TO 79½ TONS LIFT CAPACITIES... EXCAVATORS UP TO 2½ YARDS



This 120-ton test roller tested all grades and bases at the March AFB. It was built for the Corps of Engineers by Peterson Tractor & Equipment Co. of San Leandro, Calif. That's a D8 ahead.

by November 15 everything but the last of the paving was out of the way.

The highly compacted subgrade was topped out by the Bros rollers and a motor-grader finish. Surveyors' grade stakes were set every 50 feet for the

final finish, and an amazingly smooth polish was achieved by the 16-foot blades on the motor graders. A Gardner 24-foot earth planer was also used on a No. 12 grader for some of this finish work.

Special Granular Base

Special granular base under all the pavements also called for some sizable quantities. Some 220,000 cubic yards of decomposed granite, 53,000 yards of pit-run gravel, and 50,000 yards of mac-

adam had to be placed.

The decomposed granite was readily available from a pit in the Camp Haan area, less than a 2-mile haul from its point of placement. A Northwest 80-D shovel loaded this material to a fleet of Ford trailer-type trucks, capable of hauling about 18 cubic yards per trip. These units dumped the material in place, according to accurate measurement for a 4-inch lift. Blades thoroughly road-mixed the granite as water was added by the sprinklers. It was then cut out and spread, and rolled by the Southwest compactors. In all cases the Bros Wobble Wheel rollers were used for topping out, and the final course received a final dressing by the blade.

The 6-inch course of pit-run gravel was laid much the same way, except that this material went in in 3-inch lifts. There was nothing "random" about this material, however. It was carefully selected. In fact, the pit which finally produced a suitable material was 11 miles northeast of the air base, toward Beaumont. A Northwest Model 6 loaded pit-run, and a fleet of 8-yard dump trucks hauled it to the field.

One of the most interesting parts of the subbase construction was the 7-inch blanket of dry macadam. This course was built in two 3½-inch lifts, placing coarse aggregate first and then filling the voids with crusher-dust choker.

The coarse rock, in particles from ½ to 2½ inches, came by rail from a commercial rock plant at Azusa, Calif. Two Northwest clams unloaded it to dump trucks, which hauled it out to the field. When the trucks reached the field, they dumped into Jaeger aggregate spreaders, which laid the material out in an even ribbon. Choker material then came in by truck and was spread by a shop-built power spreader. At first the trucks simply tailgated the choker material, but this required too much hand labor for distribution, and the spreader was developed.

Following the application of choker course by the spreader, a labor gang with brooms leveled any ridges and worked the material down into the coarser rock. A small drag broom on a Huber 3-wheel roller worked fine too, because it dragged and vibrated the macadam as it went along. When the choker course was down, the lift was compacted by a 12-ton Buffalo-Springfield 3-axle tandem roller, and the lift was then repeated to make the complete macadam course, meanwhile adding no water to this material.

Special Test Rolling

As subgrade, decomposed granite, pit-run, and macadam courses were completed, a special super test roller was applied to check each lift for soft spots. The 120-ton monster was made for the Corps of Engineers on special order by Peterson Tractor & Equipment Co. of San Leandro, Calif. During the previous year it had been used on air-field construction in Alaska. It was shipped down especially for the March AFB job.

Pulled by a D8 Caterpillar tractor, the giant roller was so heavy that if any part of the base was weak, it immediately showed up. Every square foot of the area was covered by the test roller before the lift was okayed and the next one placed. The rubber tires of this roller put a heavier actual load on the base than any planes now on the drawing boards will.

Personnel

Corps of Engineers work at March AFB is under the general supervision of Colonel William R. Shuler, Los Angeles District Engineer, with William J. Leen as Chief of the Construction Division. Ralph E. Ferguson is Resident Engineer, assisted by Sam Eldon. Representing the U. S. Air Force on the base is Captain Richard Perez, As-

(Concluded on next page)



SIMPLE BODY-RELEASE LEVER WORKS INSTANTANEOUSLY

1 Body release lever is located at steering wheel, no reaching or stretching. Lever engages trip rod on Dumpor body...



2 Trip rod instantly releases latch hooks from body latch seat on the Dumpor chassis frame. Gravity dumps the load...



3 Body rolls on heavy-duty rollers. Snub chains attached to big coil-spring shock-absorbers check body at 70-degree tilt.

Runway and Apron For Air Force Base

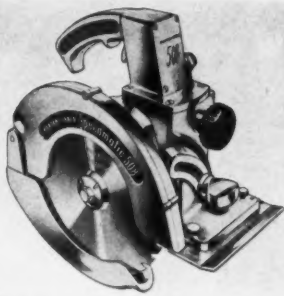
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sistant to Lieut. Col. Hode Gibson, Air Installations Officer.

PKS personnel included Herb Studer, Project Manager; John Alltucker, Assistant Project Manager; Lonnie Lawler, Excavation Superintendent; Tom Kelly, Asphalt Superintendent; Clark Tope, Concrete Superintendent; Homer Olsen, Structure Superintendent; Ed Olcott, Utility Superintendent; Bob Hoyt, Equipment Superintendent; Gil Purdy, Office Engineer; Jim Fuller, Office Manager; and William Roche, Jr., Field Engineer.

Two Electric Saws

Two electric saws with a kickproof clutch are announced by Porter-Cable Machine Co., 1714 N. Salina Ave., Syracuse, N. Y. When the blade binds in a cut or strikes a knot, the clutch allows the motor to turn while the blade remains stationary. This prevents dan-



The Speedmatic 508 electric saw cuts from 0 to 2 3/4 inches at 90 degrees and from 1/32 to 2 inches at 45 degrees.

gerous kickback. It also protects the operator, prevents damage to the gears and the work, and reduces motor burnout.

The Speedmatic saws have a depth adjustment which can be set accurately in a few seconds, the company says. They move up and down on dovetail ways which are precision-machined to maintain accuracy of cut at any depth. The saws are also equipped with safety

guard designed to cover more blade and tooth area, and to stay unjammed by chips or wet sawdust. It is not necessary to remove the safety guard in order to change blades.

The saws are designed for one-hand operation to free the other hand for holding the work. They retain the right-hand blade so that the saw rests on the main piece rather than the piece to be cut off. The bevel adjustment can be set quickly and remains set, the company claims, and the helical gears deliver 11 per cent more power to the blade than the conventional worm gears—they also eliminate dangerous torque when the saw is started. The saws operate under load at 4,500 rpm.

The Model 507, with a 7 1/2-inch blade, cuts from 0 to 2 1/2 inches maximum at 90 degrees and from 0 to 1 7/8 inch at 45 degrees. Its over-all size is 11 3/4 x 8 1/2 x 10 1/2 inches. It weighs 15 pounds. The Model 508, with an 8-inch blade, cuts from 0 to 2 3/4 inches at 90 degrees and from 1/32 to 2 inches at 45 degrees. Its over-all size is 12 x 8 3/8 x

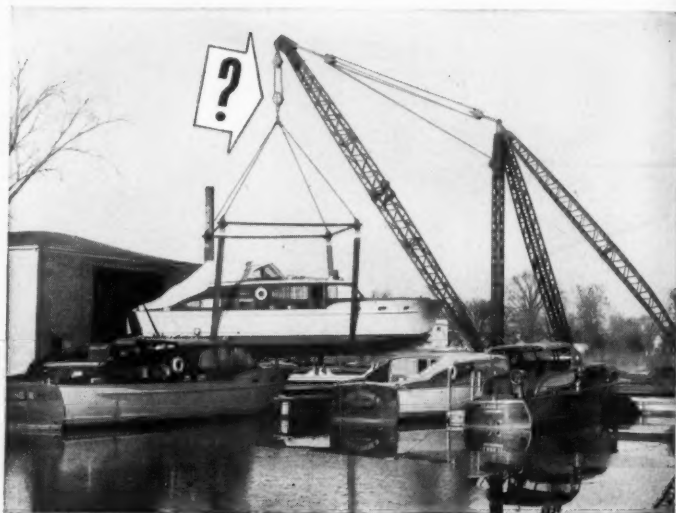
11 1/2 inches. Net weight is 17 pounds. Standard equipment for both saws includes a 10-foot cord and plug, one combination blade, a metal carrying case, a double-end wrench, a rip gage, and a tube of grease. Accessories available include a cross-cut gage; special blades for masonite, plywood, and light nonferrous metal; ripping blades; planer blades; combination blades; and abrasive disks for scoring tile, stone, asbestos, and metal.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 122.

Jackson Promotes Kister

Paul D. Kister is the newly appointed Sales Manager of Jackson Mfg. Co., Harrisburg, Pa., manufacturer of wheelbarrows, concrete carts, mortar-mixing boxes and pans, and similar equipment. Mr. Kister has been with the firm for 14 years. Glenn A. Bucher takes over Mr. Kister's former post of Assistant Sales Manager.

What's the capacity of this block?

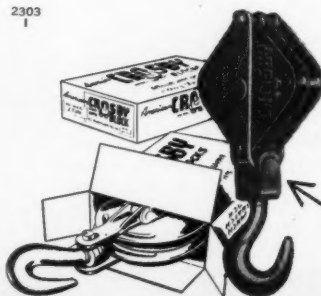


If you don't know... *don't use it!*

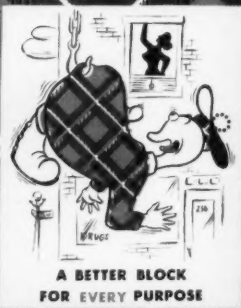
An overloaded block can be as expensive as it is dangerous. For example, just imagine dropping a cabin cruiser!

To help prevent such catastrophes, American CROSBY Wire Rope Blocks are *Load-Rated*. The safe working capacity of the block is embossed in the side plate. American CROSBY Blocks are built with the same rugged quality found in giant American crane blocks. Individually packaged, they are delivered in clean, perfect operating condition. Sold by distributors and supply houses everywhere, and made by the makers of genuine Crosby Clips, the famous wire rope fasteners... AMERICAN HOIST & DERRICK COMPANY, St. Paul 1, Minnesota.

2303



**American
CROSBY**
Load-Rated!
WIRE ROPE BLOCKS



McKISSICK Peerless SNATCH BLOCK

Gives you more work power for large or small jobs.

Built for a wide range of sheave sizes and capacities.

Rounded shells, bead encircled sheaves, prevent rope jamming.

Drop forged hooks, swing and swivel. Roller bearings or bronze bushings.

Request catalog



McKISSICK

McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

Do your sealcoating and ice control jobs the fast easy Swenson way. Spreads salt, chloride, sand or cinders any width or amount desired.

Free Information

Swenson Spreader & Mfg. Co.
Lindenwood, Illinois



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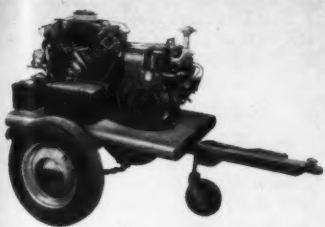
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The DeVilbiss Co., Toledo, Ohio, has introduced a line of 21, 35, and 50-cfm trailer-mounted compressors.

New Air Compressors Are Trailer-Mounted

A new line of portable air compressors has been developed by DeVilbiss Co., Toledo, Ohio. They are trailer-mounted with a standard trailer hitch for towing behind a car or truck. They also can be obtained with skid mountings where great mobility is not required or mounting in a truck body is desired.

The V-type 4-cylinder 2-stage compressors are manufactured in three sizes to deliver 21, 35, or 50 cubic feet of air per minute. Features reported by the company include automatic unloaders, trouble-free valves, forged-steel crankshafts, balanced and precision-ground ball-type main bearings, and automotive insert-type rod bearings. All parts have automatic oiling. Cooling is accomplished through finned heads, cylinders, and inter and after-coolers.

The compressors are driven by heavy-duty air-cooled industrial-type gasoline engines with either electric or magnetic starting systems. The 35 and 50-cfm compressors are equipped with governors which automatically slow down the engine while the compressor is unloading.

The chassis of each unit also serves as a tank and is equipped with a drain for accumulated moisture. Cross-braced construction of heavy tubular and channel welded steel is used in the frame. The tank is tested for 300 psi.

The 35 and 50-cfm trailer models have large leaf-type springs. Taper roller wheel bearings are used and the tires are 6.00 x 16. A retractable caster rubber-tired front wheel is used to stabilize the compressor while in operation. The 21-cfm model has a rubber-padded leg to keep the compressor level during operation.

The 35 and 50-cfm compressors are available with a steel panel enclosure which protects against weather and tampering. It is securely attached to the frame and completely covers the engine and compressor. The compressor may be operated without removing the enclosure, which has hinged side panels and a large access door in

Yours for the Asking

Further information or descriptive literature can be secured from any advertisers in this issue of **CONTRACTORS AND ENGINEERS MONTHLY**. Just write name of manufacturer and product of interest to you on the extra line provided on the post card facing page 16, fill in your own name and industry connection, mail to us and we'll do the rest.

CONTRACTORS AND ENGINEERS MONTHLY

270 Fourth Avenue New York 16, N.Y.

the front.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 104.

McHenry Joins PCA

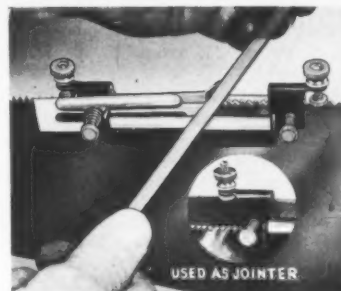
The new Administrative Assistant to A. Allan Bates, Vice President for Research and Development of the Portland Cement Association, Chicago, Ill., is Douglas McHenry, formerly head of the Concrete Laboratory Section of the U. S. Bureau of Reclamation in Denver.

Mr. McHenry is well known as the author of numerous articles on concrete technology; in 1943 he received the Sanford E. Thompson Award of the American Society for Testing Materials; and in 1944 the Telford Award of the Institute of Civil Engineers of Great Britain for papers dealing with structural behavior and research, and concrete-design problems. His experi-

ence includes six years with the Tennessee Valley Authority on the construction of Norris and Hiwassee dams and power plants; 11 years with the Structural Research Section of the Engineering Laboratories Branch of the Bureau of Reclamation (of which he was head for 9 years); and one year as head of the Concrete Laboratory Section of the Bureau—the position he held at the time of his present appointment.

New Saw Filing Jig

A jig for sharpening handsaws is being marketed by A. D. McBurney, 317 E. Fourth St., Los Angeles 13, Calif. It is held to the saw by set screws and guides the file over the teeth by a bevel bar and a set of depth-control rollers. This method keeps the teeth at the same height, which is important because only the tips of the teeth do any



For sharpening handsaws—a combination filing and jointing jig. It is said to prevent overfiling.

cutting, the manufacturer points out. The jig can also act as a jointer when used with a 6-inch mill file.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 246.



OWEN

The Universally Popular

BUCKETS

ARE IDEALLY ADAPTED TO ALL KINDS AND MAKES OF CRANES





There are dozens of types and kinds of cranes—each with its own features but *one* outstanding clamshell bucket.

Observe these various machines in action and you'll find an impressively large percentage of them equipped with Owen Buckets.

This preference has been gained through years of unequalled digging ability, speed of operation and durability.

You can obtain an Owen Bucket from us exactly suited to your present crane or have it delivered as a part of the complete crane unit.

For the utmost in performance and service on *any crane* investigate and purchase an Owen Bucket. Write for the Owen Catalog.

"A MOUTHFUL AT EVERY BITE"



THE OWEN BUCKET CO.

6030 Breakwater Avenue • Cleveland 2, Ohio

Branches:
New York, Philadelphia, Chicago, Berkeley, Calif.









Plumber or Engineer: Whose Pay Is Better?

To the Editors,
CONTRACTORS AND ENGINEERS MONTHLY
Dear Sirs:

I have had a high regard for your facts and figures, but in your April editorial "An Open Letter to Engineers" concerning the betterment of the profession, you state, "Whether or not the engineer continues to place somewhere between a plumber and doctor . . ."

You greatly exaggerate the pay and working conditions of the average engineer as compared to those of a plumber. . . .

The contractor's co-workers, who are mostly civil engineers, have much worse pay and working conditions than the contractor's men—although they are paid out of exactly the same funds—since they do not get overtime and bonus pay but are subject to the same temporary work, moves, layoffs, and, in depressions, cuts. . . .

The reason for civil engineers' low pay and poor working conditions is that most executives consider it their primary duty to keep engineering costs and percentages low. Most of them consider a \$10 a month raise a very high increase. The engineers who earn more than \$7,000 a year are so few in number that they do not affect the average to any extent.

Not even supply and demand in an increasing shortage of engineers . . . has for the past eight years caused much increase in average pay or working conditions for civil engineers—if compared with union labor . . . or with minimum pay and overtime for non-union labor on state highway construction.

The answer to the shortage of engineers and [to the problem of] bettering the civil engineers' economic and social standing is the same as for union labor, or doctors, lawyers, and dentists—more pay and better working conditions. To date the ASCE has been a total failure on this item, as all their acts have been census statistics and "viewing with alarm" speeches of the sermon type.

Yours very truly,
Edward F. Maddox,
Member ASCE
Dallas, Texas

Buckius Is Chief Engineer Of Pa. Highway Department

C. H. Buckius has taken over the post of Chief Engineer of the Pennsylvania Department of Highways. He succeeds E. L. Schmidt, who became Secretary of Highways on the death of Ray F. Smock.

Mr. Buckius is one of the oldest members of the Department as far as service is concerned, having started at the age of 15 as a chainman. He has held various positions in the Department, and, from 1939 until his present appointment, he was Assistant Secretary of Highways and Assistant Chief Engineer.

Vermiculite Institute Meets

Vermiculite processors from all parts of the United States and from Canada were present at the Annual Meeting of the Vermiculite Institute of Chicago at the Arizona Inn, Tucson, Ariz., on April 1-5. G. R. Stark, Texas Vermiculite Co., Austin, Texas, presided. Guest speaker was L. H. Yeager, General Manager, Gypsum Association.

Subjects discussed by Mr. Yeager and other speakers included the steel saving and cost reduction effected by the use of lightweight vermiculite-gypsum plaster; a plan for organizing a technical service department to coordinate vermiculite with products of allied industries; reports on test results of vermiculite plastering and acoustical plas-

tic, with resulting new specifications; test results on vermiculite concrete sandwich panels in tilt-up construction; and new specifications for vermiculite-concrete floors.

C. A. Pratt, Western Mineral Products Co., Minneapolis, Minn., was elected President of the Institute in succession to Mr. Stark, and the following were named directors: L. G. McDiarmaid, Insulation Industries, Vancouver, B. C. (succeeding G. R. Stark); and Frank John, Zonolite Insulation Co., St. Louis, Mo. (succeeding S. K. Robinson, Montreal, Que.).

Social events included a trip to Grand Canyon National Park and the annual banquet at the Arizona Inn.

Heavy-Duty Transmissions

A booklet of condensed specifications on the entire line of Fuller heavy-duty transmissions and auxiliaries is announced by Fuller Mfg. Co., Kalamazoo, Mich.

Quick-reference data include the number of speeds, type of mounting, whether truck or industrial application or both, gear ratios, and approximate engine size. The booklet also lists installation dimensions, weight, location of control, clutch housing size, oil capacity, location of power-takeoff opening, and relative speed of PTO to input rpm. Cutaway illustrations of the major types and sizes of both unit transmis-

sions and auxiliaries are shown.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 103.

Randolph Joins Fageol

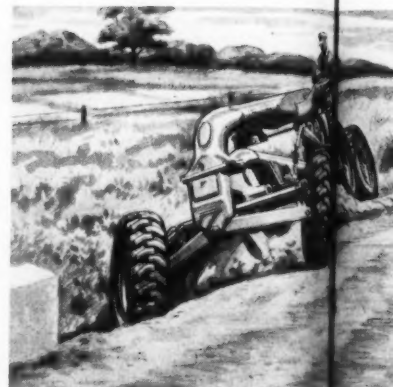
Russell H. Randolph is General Sales Director of Fageol Heat Machine Co., Detroit, Mich. In his new post he will take care of the distribution of heat machines through more than 500 supply houses, hardware wholesalers and automotive and construction equipment dealers. Mr. Randolph has for the last 15 years been Regional Sales Representative of The Boss Mfg. Co., Kewanee, Ill.

Allis-Chalmers AD-40

FIRST WITH BUILT-IN



You will do more and better work, do it easily and safely with the new Allis-Chalmers AD-40 motor grader. One big reason is the new built-in hydraulic power steering system—another Allis-Chalmers first in the motor grader field. The AD-40 is specifically designed to use this advanced system which retains the accuracy and roadability of mechanical steering . . . and adds the ease and smoothness of hydraulic steering. What's more, the hydraulic power steering unit is inside the head casting, with a short shaft to eliminate "spongy" steering. And hydraulic lines are enclosed in the frame . . . fully protected from external damage. See what HYDRAGUIDE®, the outstanding new power steering system, does for you on these jobs . . .



ditching is fast, accurate, complete power goes to work for you the instant you . . . does most of the steering work for you! You can turn far easier, far faster . . . work around poles or other obstructions before turning



plowing snow—always a tough job due to added front-end weight of either blade or rotary unit—becomes much simpler . . . much more accurate when hydraulic power steering goes to work for you.



muck, sand, soft ditches are no longer. Thanks to power steering, you wheel rather than wrestle it. Because of it, side and turn at the same time.

See your Allis-Chalmers dealer for the story
the Newest, Finest line on the

Concrete-Detailing Manual

The "Manual of Standard Practice for Detailing Reinforced-Concrete Structures", a standard of the American Concrete Institute, has been completely revised to include A-305 deformed reinforcing bars, and the higher bond values permitted by the 1951 ACI Building Code. In addition, several other changes to conform to the ACI code were made. All references to bars conform to the numbered designations of the U. S. Department of Commerce Simplified Practice Recommendation R26-50.

This ACI standard, widely known and used by designers, draftsmen, and en-

gineering schools, includes 21 typical engineering and placing drawings for various types of structures. A short discussion of the important points accompanies each drawing. Large format and wire binding make the manual easy to use at desk or drafting board.

The manual may be purchased from the American Concrete Institute, 18263 W. McNichols Road, Detroit 19, Mich., at \$3.00 per copy.

C. L. Warwick of ASTM Dies

C. Laurence Warwick, Executive Secretary of the American Society for Testing Materials and its administrative head since 1919, died suddenly as a

result of a heart attack on April 23, immediately after presiding at a dinner honoring the retiring Treasurer of the Society.

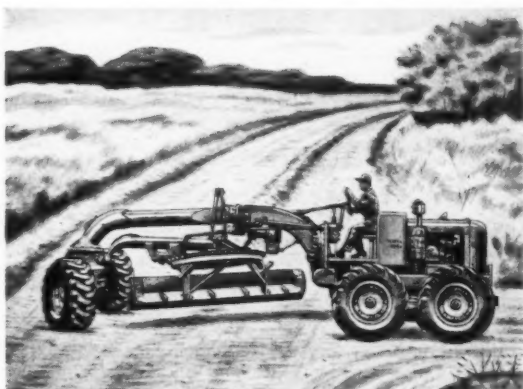
Mr. Warwick had made many notable contributions to standardization and research in materials and was recognized as an outstanding authority in this field. One of his important contributions was in the War Production Board during World War II, where he served as Head of the Specifications Branch of the Conservation Division, and later headed the Materials Division. Due to his work, tremendous savings of critical and strategic war materials resulted through the issuance of emergency standards. Mr. Warwick

was the author of many technical papers and reports dealing with properties and tests of engineering materials, especially standardization of specifications and tests.

Waukesha Motor to Build Lab

Waukesha Motor Co., Waukesha, Wis., plans a new Experimental and Research Laboratory, and ground for it was broken last April near the west end of the company's property on St. Paul Avenue. The building, which is scheduled for completion in January, 1953, will be of steel and brick, one story high, rectangular in shape and measuring 90 x 201 feet.

MOTOR GRADERS A NEW KIND OF POWER STEERING



turning around is quick, easy, safe. With built-in power steering you can turn with just one finger—even while stopped. Fast, precise control greatly cuts down interference with moving traffic . . . gives you safe command even on dangerous mountain turns.



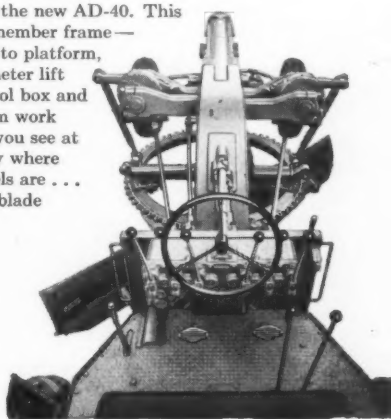
bank sloping is easier with the AD-40. Power steering gets you into position fast . . . lets you operate on steep slopes without the tiring "wheel fight" you've always known before. In addition, ease of control assures a smooth, even grade on every job.



holes and bumps cause no "wheel kick" because this new system cushions shock . . . keeps jolted front wheels from "steering back" at you. You turn only when you want to turn.

you get full visibility, too!

Here's the view you have from the platform of the new AD-40. This grader's single-member frame—from front axle to platform, its smaller diameter lift cases, low control box and tapered platform work together to let you see at all times exactly where your front wheels are . . . just what your blade is doing.



ALLIS-CHALMERS

TRACTOR DIVISION - MILWAUKEE 1, U. S. A.

Paving Parking Apron At Air Force Base

(Continued from page 55)

pace with the pavers at all times. Forms filled one day were moved ahead the next. Pin pulling was mechanical, and a winch-equipped truck moved the sections ahead.

Batching

Batching of concrete aggregates was such a sizable undertaking that Kiewit decided to use commercial aggregate producers under a subcontract agreement. Triangle Rock Co. and Consolidated Rock Products Co. were the two suppliers, and their job consisted of furnishing and batching all the dry material to Kiewit's tandem-axle GMC 4-batch trucks.

There were two batch plants: a shop-assembled 150-ton semiautomatic Triangle plant, and a Noble 150-ton semiautomatic batcher. Charging cranes included a Lima 2-yard clam and a Northwest Model 6 carrying a 1 3/4-yard clam bucket.

Riverside and Colton bulk cements were used, and Type II cement was specified for the mix. There was storage at the project for approximately 1,500 barrels of this material.

A fleet of GMC batch trucks, all company-owned, took care of even the longest hauls, because the batching facilities were also set up on the airport property. Aggregates came from Triangle's Mira Loma and Highland Avenue plants, and were transferred to the batch plant by truck.

Under ordinary circumstances, the March AFB paving could have been an extremely tough job for two reasons. It called for enormous yardages of concrete, and the warped grades would have caused many crews no end of trouble. On both counts the job planning and crew experience of the Peter Kiewit organization paid off. By this past April the project was finished and ready for use by the B-29's and XB-47's stationed at March Field.

Personnel

Kiewit's operations were directed by Herb Studer, Project Manager, with Thomas Paul as District Manager at Arcadia. John Alltucker was Assistant Project Manager, and Clark Tope was Paving Superintendent.

Colonel William R. Shuler, Los An-



White-pigmented membrane curing solution was applied to the March Field concrete by the Techkote Co. of Inglewood, Calif., under a curing subcontract.

geles District Engineer of the Corps of Engineers, was in general charge of the project. William J. Leen was his Chief of Operations, and Ralph Ferguson was Resident Engineer. The Air Force engineering officer assigned to the project

was Captain Richard A. Perez, who is Assistant to Col. Hode Gibson, Air Installations Officer at March Air Force Base.

Remember—Safety Is No Accident!

Booklet on Asphalt Mixer

Information on a portable asphalt mixer for patch work is presented in a brochure issued by K. E. McConaughay, 217 N. 6th St., Lafayette, Ind. It illustrates the HTD doing hot patch work and producing cold and heated mixtures.

The unit has a capacity of 3 cubic feet and is powered by a 6-hp air-cooled engine with clutch. It has two burners with a vaporizing coil and fuel pump. The mixer will turn out asphaltic concrete, sheet asphalt, sand asphalt, or mastic asphalt.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 117.

New NYC Office Address

The New York office of A. Leschen & Son Rope Co., St. Louis, Mo., has changed its address. Formerly at 90 West Street, it is now at 75 Varick Street.



Loading out scrap material



Bulldozing



Industrial material handling



Backfilling foundations

Take the Word of ...Thousands

Don't just take our word for the real, day-to-day usefulness of the Oliver "OC-3". Take the proof offered by the thousands of users . . . the thousands of uses . . . of this powerful little tractor. Just ask any owner what he thinks of his "OC-3". In the more than 12 years that the "OC-3" and its predecessor, the "HG", have been in production, they have built a reputation for user acceptance that's unequaled in their class. Proof of this is the fact that it's mighty hard to get a used "OC-3". Users just don't often sell their "OC-3" tractors.

With an "OC-3" and its broad line of matched equipment . . . bulldozer, trailbuilder, front end loader, lifting fork, sidewalk snow plow, hydraulic drawbar, winch, logging kits, and many others . . . you can perform all sorts of useful tasks every day.

The "OC-3" has plenty of power to handle all those jobs with ease . . . a full 22 drawbar h.p. It's ruggedly built to keep maintenance and operating costs down.

Why not have your Oliver Industrial Distributor give you all the facts on the "OC-3", the lowest priced industrial crawler tractor built. Call him or write direct to The Oliver Corporation, Industrial Division, 19300 Euclid Avenue, Cleveland 17, Ohio.



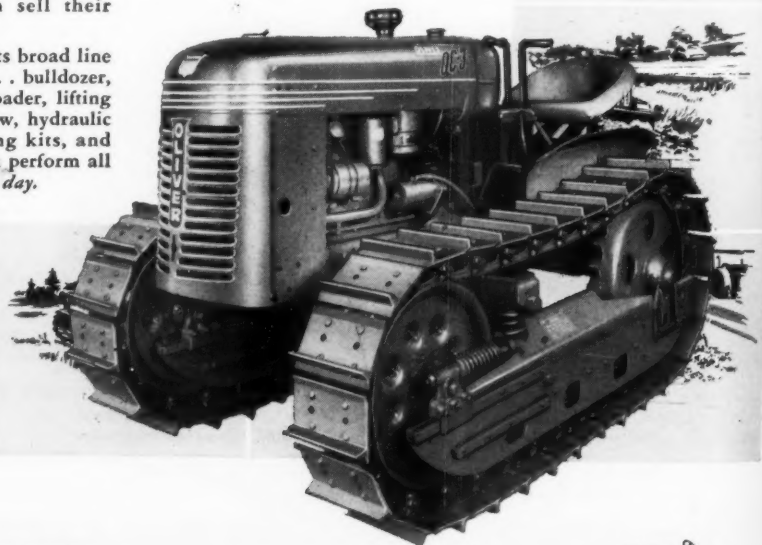
Sidewalk snow plowing



Loading out topsoil



Winch operations



THE OLIVER CORPORATION

a complete line of industrial wheel and crawler tractors



SPEED FORMS

Make Big Savings on Material and Labor

You Don't Have To Buy New Forms For Every Poured Concrete Job

SPEED FORMS can be set up, stripped, cleaned, moved and reused in far less time than wood. Lightweight, easy to handle. No heavy bracing needed. No gadgets or special fastenings—Units go together with wedge clips.

Made of Steel—Good for reuse again and again on job after job indefinitely without repair. Reduce material costs way below wood—Many records of 400-500 and more uses.

Just send us plans of the job. Let us show you how to save Real Money on Form Work.

Write Dept. ME. Ask a representative to call.

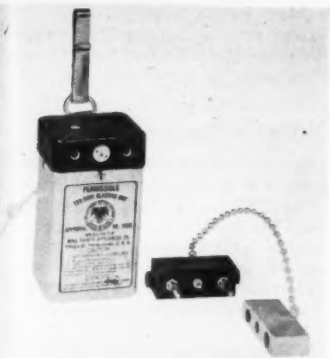
Face-wall form unit



Wedge clip

IRVINGTON FORM AND TANK CORP.

20 VESEY ST., NEW YORK 7, N. Y.



The MSA multiple-shot blasting unit fires up to 10 shots simultaneously.

New Blasting Unit

A multiple-shot blasting unit said to incorporate improved firing action, safety, and dependability in a compact and lightweight assembly has been introduced by Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa. It weighs one pound, measures $2\frac{1}{2} \times 2\frac{1}{4} \times 4\frac{3}{4}$ inches, and is designed to fire up to 10 shots simultaneously. There is no danger of accidental firing, its designers point out, as the wiring circuit is completely insulated from the battery container. The top of the battery container and the push-button lead retainers also are insulated, and the dry-cell batteries are housed in a moisture-resistant case. Because the new unit is capacitor-operated, the full charge is dissipated with each shot, eliminating misfires.

The firing plug has brass contact terminals. Lead wires are firmly held in the firing plug by spring-loaded retainers. When lead wires are inserted, and the firing plug pressed firmly into the battery container, a neon light glows at the top of the case to indicate a full charge in the capacitor. Release sends a high voltage to detonate the charge.

Further information may be secured from the company by requesting Bulletin No. 0901-1. Or use the Request Card at page 16. Circle No. 170.

Improved Tool Line

An improved line of bolt cutters, strap shears, hot-line wire cutters, and sheet-metal hand tools has been introduced by Interstate Drop Forge Co., 4051 N. 27th St., Milwaukee, Wis. (Interstate recently acquired the tool line of Helwig Mfg. Co., St. Paul.)

The tools feature heat-treated drop-forged handles, plates, and jaws. Drop forgings are used in place of castings to increase strength and rigidity and reduce over-all weight; because they are full-forged, the side plates cannot twist. According to Interstate, the gear principle of achieving leverage makes the tools simple in design, and there are no complicated toggle mechanisms.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 127.

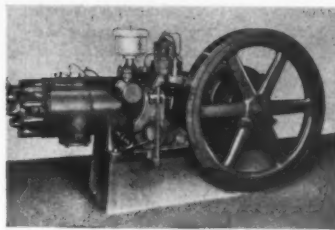


Four sizes of bolt and rivet cutters are included in the improved line of Helwig tools.

New Diesel Engine

A horizontal-type single-cylinder two-cycle diesel engine is announced by White-Roth Machine Corp., Lorain, Ohio. The Model DA is a companion power plant to the line of Lorain Model L, O, and R engines, and has a 13-inch bore and stroke and a continuous rating of 55 bhp at 325 rpm.

It features tapered roller bearings for the crankshaft and auxiliary shafts. A wet-sleeve cylinder liner of alloy cast iron is said to give long life and easy replacement in the field. The engine can be operated as a cold-starting full diesel, or can be converted in the field to burn natural gas or butane. The radiator-type cooling system is designed for adequate cooling under all



The Lorain Model DA diesel engine as shown is used as a prime mover in pump and generator service, etc. It has 13-inch bore and stroke and continuous rating of 55 bhp at 325 rpm.

load or atmospheric conditions.

A Pickering governor, Air Maze oil-bath cleaner, McCord lubricator, and built-in $7\frac{1}{2}$ -hp Lorain gasoline starter

are standard equipment. A Twin Disc clutch is optional. Over-all dimensions are: length 117 inches; width 55 inches; height 60 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 149.

L. B. Foster Ups Anderson

R. A. Anderson is Southwest Regional Manager for L. B. Foster Co., Pittsburgh, Pa., supplier of railroad trackage, steel-sheet piling, and pipe. Mr. Anderson, who succeeds the late J. B. Strauss, joined Foster five years ago and has been General Sales Engineer in Houston, Texas, since 1948. In his new position he will continue to make his headquarters at Houston.

Like Mules and Canyon Trails...

they Go Together

**ALL-WHEEL
DRIVE**

Power in the front drivers makes it safe to bulldoze headfirst down a steep slope... easy to back-up for another load.

**ALL-WHEEL
STEER**

Starting to straighten out after making the turn... rear steer keeps its end of the Grader out of danger.

Yes, All-Wheel Drive and All-Wheel Steer go together... work together... on every job. Take the matchless traction and power-at-the-blade of All-Wheel Drive; add the superb maneuverability of All-Wheel Steer and you get Controlled Traction, which moves more material... of any kind... farther and faster.

Why be satisfied with less in a motor grader?

AUSTIN-WESTERN COMPANY · Subsidiary of Baldwin-Lima-Hamilton Corporation · AURORA, ILLINOIS, U.S.A.

Austin Western

SINCE 1859—BUILDERS OF CONSTRUCTION EQUIPMENT

CHECK THE RED REQUEST CARD!

For further information on the new equipment, new materials, and new literature described in this issue of Contractors and Engineers Monthly, check the item number on the Red Request Card bound in at page 16. No obligation, of course, and we will forward your request directly to the manufacturer.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York 16, N. Y.

Welding Technique Saves on Repair Job

A new electrode that cuts iron and steel without the use of oxygen was an important factor in a repair job that is estimated to have saved \$1,300 and 12 days of down time for a contractor at San Jose, Calif.

A broken cap screw in the grease had caused a series of breaks in the final-drive housing of an Allis-Chalmers HD-5 crawler tractor. It was estimated that 256 man-hours would be required to replace the \$900 housing. With labor at \$2.29 per hour, this meant \$1,486 for the job.

Personnel from Pacific Hardware & Steel Co., San Jose distributor for All-State Welding Alloys Co., Inc., and welder Frank Booth of Materials Equipment & Supply Co., found an easier way. By partially disassembling and then welding, Booth completed the job in 64 hours, for \$146.56. The All-State brazing rods, cutting electrodes, and accessories cost \$34.32. The total cost, then, was \$180.88, a saving of \$1,305.

Booth's method consisted of pressing the broken pieces back in place with jacks and tack-welding. The casting was then veed along the broken line with the cutting electrode. Eighteen pounds of brazing alloy and 10 pounds of electrode were used. Because the alloy's working temperature was only 1,650 degrees F, preheating and after-cooling were avoided. Only a grinder was needed to fit the bearing race in the repaired housing.

Catalog on Vibrating Tamper

A booklet on a vibrating tamper for continuous macadam construction is issued by The International Vibration Co., 16702 Waterloo Road, Cleveland 10, Ohio. It shows how the Vibro-Tamper is used to compact loose aggregate up to 15 inches thick.

Six 435-pound shoes, representing a contact area of 18 square feet, do the tamping and vibrating. The unit travels from 16 to 45 feet per minute and delivers a compacting force of about 8,000 pounds per shoe. It weighs about 9,000 pounds and is of all-welded construction.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 115.

Photogrammetry Society News

Photogrammetry, which celebrates its one hundredth birthday this year, is represented in America by The American Society of Photogrammetry, Box 18, Benjamin Franklin Station, Washington 4, D. C. The Society now has 2,600 members, and in September it will play host in Washington to The International Society of Photogrammetry, which is meeting there.

Newly elected principal officers of ASOP are: George D. Whitmore, President; Alfred O. Quinn, First Vice President; and Ford Bartlett, Second Vice President.

Mr. Whitmore is Chief of the Technical Staff of the Geological Survey's Topographic Division and is widely known in surveying and mapping circles for his writings and activities in professional societies. He has written on advanced surveying and mapping, geodetic surveying, elements of photogrammetry, and city surveying; he is a member of the American Society of Civil Engineers, the Society of the American Military Engineers, the American Geophysical Union, and is a past President of the American Congress on Surveying and Mapping.

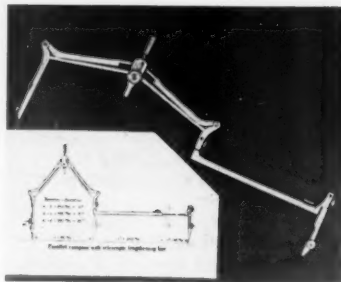
Mr. Quinn is Chief of Engineering and Field Surveys of Aero Service Corp., Philadelphia, and is co-author with Professor Earl Church of "Elements of Photogrammetry". Mr. Bartlett is President of Lockwood, Kessler

& Bartlett, Inc., Great Neck, N. Y., and is a member of the Engineering Advisory Committee of the New York City Planning Commission.

Drawing Instrument

A drawing instrument combining a straight compass, giant bow, and beam compass in one unit has been placed on the market by A. Partrick Co., 9 Grove St., Westwood, N. J. It is precision-made of nickel silver and draws circles up to 26 inches.

As the compass opens, the lower legs automatically stay perpendicular to the paper, placing pen and pencil parts in the best position for drawing. This technique works with or without self-contained lengthening bars.



The Partrick parallel compass combines a straight compass, giant bow, and beam compass in one instrument.

The compass has symmetrical shanks and fine adjustment. A screw on the head of the compass firmly locks the

instrument in any position.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 147.

Data on Cement Testing

A 6-page bulletin on cement-testing equipment is offered by Central Scientific Co., 1702 Irving Park Road, Chicago 13, Ill. It illustrates and describes the Cenco-Menzel autoclave for testing cement soundness, an entrained-air indicator, a ductility tester for bituminous material, a viscosimeter, penetrometers, etc.

This literature may be obtained from the company by requesting Circular 1212, or by using the Request Card at page 16. Circle No. 141.

SEE THE New Gar Wood

3/4 yd. SHOVELS, CRANES

New 3/4 yd. shovel, in standard-duty and heavy-duty models.

New 20 ton, heavy-duty truck crane, especially designed for long boom work.



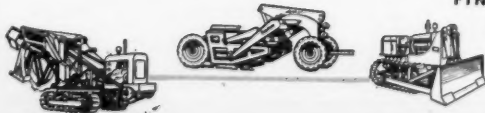
Designed to Combine These Outstanding Features . . .

- **INSTANT MANUAL CONTROLS** give a positive, smooth "feel" of the machine. Operator maintains a steady working pace.
- **POWER ACTUATED DRUM CLUTCHES** with exceptional sensitivity of control. Reduce operator fatigue, increase output.
- **DUAL RIGHT ANGLE DRIVE** connected by flexible universal couplings. Eliminates trouble factors of chain drives.
- **FLUID COUPLINGS**, offered as optional equipment, reduces shock loads — gives ultimate in smooth lift crane operation.
- **INDEPENDENT CHAIN CROWD** is powerful and positive, gets full engine power into the crowd . . . also many other features designed to insure efficiency at minimum operating expense.

GAR WOOD INDUSTRIES, INC.

FINDLAY DIVISION • EXECUTIVE OFFICES • WAYNE, MICHIGAN

Construction Equipment: Excavators, Scrapers, Dozers, Ditchers, Spreaders, Finegraders, Truck-mounted Road Graders. Truck Equipment: Dump Truck Bodies & Hoists, Winches & Cranes, Refuse Collection Bodies, Elevating End Gates.



New Magnetic Probe

A pen-sized magnetic probe is announced by General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa. The point of the magnet can be extended or retracted from the case by turning the end, and the magnet strength can be controlled by the amount of the extension. A pocket clip is provided for safe, easy carrying.

The G-S probe will remove sharp particles of steel, iron, or nickel from storage bins; retrieve magnetic particles from holes and similar hard-to-reach places; and test surfaces for magnetic properties of the under-material.

The probe will also remove steel splinters from the eyes or skin. A nurse



The G-S magnetic probe for removing steel and iron particles from storage bins—among other uses—is the size of a fountain pen.

or doctor can adjust the strength of the magnet for proper extraction to reduce pain or rupture of tissues. The magnet

can be sterilized without harming it. Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 140.

Hough Sells Sweeper Line

The Meili-Blumberg Corp., New Holstein, Wis., has concluded an arrangement with The Frank G. Hough Co., Libertyville, Ill., acquiring Hough's complete line of tractor sweepers. Meili-Blumberg will distribute as well as continue the manufacture of all such sweepers under the M-B trademark. The sweeper line will include pull-type sweepers, universal sweepers, and tractor-mounted front-end sweepers, for International, Case, Ford, and other tractor makes.

Engineer Research For Military Needs

Korea has turned out to be a valuable proving ground for new military engineering equipment.

Colonel O. B. Beasley, Commanding Officer, Engineer Research and Development Laboratories, Fort Belvoir, Va., has published some facts about recent trends in military equipment, and the relative importance of the various types now in use.

First as to bridges. Most significant is the increase in live loads and roadway widths: division loads which are now officially placed at 60 tons may rise 40 per cent in the near future, and the 13-foot 6-inch bridge width also seems to be due for an upward revision. As to material for bridges, low-alloy steel remains the most important and dependable; wood, aluminum, plastics, etc. are under constant study as substitutes for steel, but so far none has been classified as acceptable. As to bridge types: modern fixed bridges with a greater capacity than the Bailey bridges used in World War II can be erected in less time; panel-type bridges remain the most economical and satisfactory for tactical use; floating bridges still use pneumatic floats because of their adaptability to a variety of bank conditions, their light weight, their easy handling and packaging for transport, as well as their ability to withstand direct attack by enemy aircraft or shell fire. Bridge-testing methods have changed since World War II. At that time bridges were designed to cope with stream velocities of 5 feet per second; now they handle 8 feet per second and may soon go up to 11. It is hoped that, in order to overcome foundation problems, the panel-type approach span will soon dispense with the use of trestle equipment.

Turning to road and airfield construction, Colonel Beasley says that equipment for this still avoids special military designs: The necessity is for extremely mobile machinery economical and easy to procure. This is the only way to meet this war's need for more road maintenance at higher traffic-capacity standards. Field construction equipment, he says, is more important than ever: the objective is a family of high-speed rubber-tired equipment featuring commercial designs and able to operate at minus 25 degrees F. For operation at lower temperatures than this, special winterization kits will be necessary.

As regards engines, here too the aim is to develop a family of industrial engines from 15 to 225 hp. Objectives are reduction of spare parts, interchangeability of parts, and economy of production. Electric generators come next on Colonel Beasley's list, and he says that air-cooled engines are the only means of further reducing the size and weight of 500-watt to 5-kilowatt generators. The development of a general-purpose family is aimed at, including 60-cycle and higher ac sets adjustable to British equipment.

Illumination for military needs is an important subject, and searchlight units are again in demand for tactical purposes in Korea. Under way are basic studies in high-intensity light sources and the perfection of infrared equipment for night combat.

Finally, in air-photography equipment for mapping, much of the original German research in distortion-free optical elements is being used and improved, while map papers that do not expand or contract are also being developed. The basic photographic problem is making tactical air photography available to small combat units, and the dry (or ammonia) process of reproduction is the most promising. Also, new triangulation methods and accurate range-determining devices are being studied to eliminate the slow process of chaining in aerial surveys.

Shovels

Gar Wood's 75 Series shovels are new to the civilian market although hundreds are in use by the armed forces . . . Three base machines are offered. The 75A, a standard duty $\frac{3}{4}$ yd. model; the 75B, heavy-duty $\frac{3}{4}$ yd. model and the 75BT, 20 ton truck crane.

All models are easily convertible *in the field* for shovel, lift crane, clam, dragline, magnet, trench-hoe and pile driver work. Only Gar Wood offers the new Foundation Borer, an attachment that opens an entirely new source of profit to power excavator operators. A few Gar Wood features are listed below. Check your Gar Wood shovel distributor for full information.



New FOUNDATION BORER

A Gar Wood Exclusive! Combines belling and boring for caisson holes into one operation for faster, cheaper construction of foundations.



New TRENCH HOE

$\frac{3}{4}$ yd. dipper capacity with 3 other optional dippers. Digs to 17'10" depth with a cutting width of 20'16"

TRUCK CRANES

New crane with standard 35 ft. boom . . . 75A lifts 16,500 lbs., 75B lifts 21,200 lbs. on 12 foot radius.



GAR WOOD INDUSTRIES



C. & E. M. Photo

This view of the west side of the Atlantic Beach Bridge shows Frederick Snare Corp.'s No. 126 rig, a Wiley Whirley with an 85-foot boom, at the left; a stiff-leg derrick on the north approach spans; rig No. 41 alongside the flanking pier; and another stiffleg derrick on the south approach spans.

Bascule-Span Bridge Has 6 Traffic Lanes

Big Piers Poured With Transit-Mix Concrete Trucked Across Channel on Trestle and Long-Car Float to Derrick Boats

• **DELIVERING** over 10,000 cubic yards of transit-mix concrete for the construction of four piers at the navigation channel of a 1,173-foot bridge posed something of a problem to the contractor concerned. Frederick Snare Corp., New York City contracting engineer, got by that one nicely by building a 150-foot trestle out from the shore, and joining a 240-foot car float at the end. Truck mixers drove over this work span and discharged the concrete into buckets that were handled by floating rigs moored alongside the piers. Thus the use of a floating concrete-mixing plant was eliminated, together with its auxiliary material barges and tow craft that would have pretty well blocked the waterway.

The recently completed Atlantic Beach Bridge over Reynolds Channel, an outlet to the ocean, connects Lawrence, N. Y., on the Long Island mainland, with Atlantic Beach, a seashore resort. Carrying six lanes of traffic, the new toll structure replaces a paralleling three-lane span about 150 feet to the east. It is located in Nassau County and runs about north and south, from the barrier reef on the south to the Long Island mainland on the north.

Built by the Nassau County Bridge Authority, the modern high-level cross-

ing with a 153-foot bascule span eliminates one of the most troublesome traffic bottlenecks on Long Island. Total cost of the project was approximately \$6,000,000. Construction got under way in November, 1950, and was completed early this year.

The Old and the New

The new bridge is about the same length and construction as the old. Built 25 years ago, the original span consisted of a series of trestle bents made up of six 18-inch-square concrete piles. They supported a concrete deck slab wide enough for three 9-foot traffic lanes, with a footwalk along the west side. At the channel, a double-leaf bascule provided only a 15-foot vertical clearance, with the result that on days of heavy boat traffic this span was raised and lowered as many as 110 times. Vehicular traffic was often backed up for miles in consequence.

In the new bridge, reinforced-concrete piles in the bents are 24 inches square, 65 to 88 feet long, and have an average weight of 25 tons. Of the twelve bents, nine contain 13 plumb piles, while in the other three bents, where they are driven on a batter, there are 16 piles. Concrete caps, 3½ feet deep x 3 feet wide, go over the tops of the pile

bents to support the ten 36-inch wide-flange steel stringers. The superstructure is designed for H20-44 loading, and the 68-foot clear roadway of the concrete deck slab accommodates six lanes of traffic. Along one side of the bridge there is a 6-foot sidewalk.

At the channel, a 153-foot double-leaf steel bascule span provides a 100-foot horizontal clearance. In closed position the bascule offers 27 feet of vertical clearance above mean high water, which is considered to be 2.0 elevation, with mean sea level at 0.0. Thus most small boats can go under the structure without requiring the bascule to be lifted.

Concrete Piles

The bascule, or 153-foot main span, is supported on the north bascule pier and the south bascule pier. Flanking spans of 75 feet go back from these to piers 1N and 1S on the north and south sides respectively. On the north side there are eight approach spans at 55 feet over piers numbered up to 8N, and then a 50-foot span to the north abutment. On the south side there are six approach spans at 55 feet over piers numbered up to 6S, and then a 50-foot span to the south abutment. Total length is 1,173 feet.

Piers 3N, 3S, and 7N are the bents with the battered piles. Concrete piles were cast on the job, and driven with Snare's floating rig No. 129. This rig consists of a 141 x 51-foot wooden hull drawing 8 feet of water, on which is mounted an A-frame supporting a 136-foot boom. An oil-fired boiler furnished steam for the McKiernan-Terry S8 hammer used in driving the piles.

At each bent 8 timber piles were first driven to support timber falsework for the template that kept the concrete piles in line. Depth of water in the inlet averages around 25 feet. The concrete piles were both driven and jetted into fine sand that provided the required bearing. Average penetration was down to minus 55 elevation.

Big Piers on Timber Piles

Untreated-timber piles, with 8-inch tips and 12-inch butts, support the main bascule piers and the dual-type flanking span piers, 1N and 1S. The north bascule pier, 119 x 26 feet, has 312 piles, while the south bascule pier, 113 x 26 feet, has 296 piles. Each of the dual flanking span piers measures 26 x 23 feet and required 56 piles—or 224 piles for both structures. Piles average 25 feet in length, and were driven under water prior to the building of the pier cofferdams.

Before the piles were driven, the pier areas were first pre-excavated—the main piers down to minus 40 and the flanking span piers down to minus 36. Heavy clay and silt were dug out with a crawler crane equipped with a 1½-yard clamshell bucket and mounted on a barge, after indifferent progress had been made with a dredge. Material was spilled off to the side of the pier sites.

Pile driver 36, a floating rig with a



Frederick Snare Corp. Photo

Frederick Snare's floating rig drives sheet piling for the bascule-pier cofferdam on the bridge project.

50 x 30-foot wooden hull, drove the timber piles with a McKiernan-Terry 10-B-3 hammer, the steam being supplied by a coal-burning boiler. This rig has 65-foot fixed wooden leads within which are sliding steel leads that can be raised and lowered.

Steel H-piles and Monotube cast-in-place piles for the two abutments were driven with land rigs—crawler cranes equipped with McKiernan-Terry 9-B-2 hammers.

Pier Cofferdams

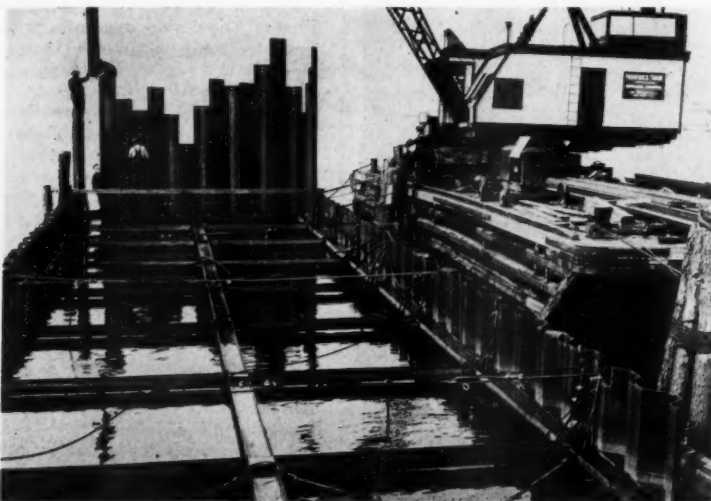
The bascule and flanking piers of mass concrete were built within steel-sheet-pile cofferdams; the south bascule pier was constructed first. A line of sheeting was driven to form the shore side of the cofferdam, while seven timber pin piles were driven in line along the opposite side. Then a steel frame, handled by the floating rigs, was hung in place between these two rows and supported by both the sheeting and pin piles.

Built by the Oltmer Iron Works of Jersey City, N. J., the frame had the same dimensions as the pier—26 x 113 feet—and had a depth of 21 feet. Main members were 21-inch WF beams, while the cross bracing consisted of 12-inch WF sections. When properly positioned, the three rings or outer bracing were at elevations 2, minus 9 and minus 19. Bracing at the lowest level was left in the concrete, but the two upper rings were withdrawn with the frame for re-use.

Weighing about 80 tons, this frame not only served as interior bracing for the cofferdam, but also acted as a template or form for driving the rest of the cofferdam sheeting. This was something of precision driving for there was less than 2 feet of clearance between the timber foundation piles and the steel sheeting. L. B. Foster Co. of New York City supplied rental piling for the job: 60-foot lengths of MZ-27 and MZ-22 Carnegie-Illinois sections.

Cofferdams of similar design were

(Continued on next page)



The bascule and flanking piers of Atlantic Beach Bridge were built within cofferdams of L. B. Foster steel sheet piling. Notice the steel frame which serves as interior bracing for the coffer as well as a template.



Frederick Snare Corp. Photo

The longer approach spans on the north side of the bascule pier meant that the car float alone did not reach the cofferdam. So the contractor erected a 150-foot timber work trestle, with a 10-foot roadway, out from the shore on 3-pile bents, and the car float was stretched out beyond it.

used in the construction of the flanking piers. Two frames sufficed for the four separate flanking structures, and all the steel bracing was removed in their construction. Most of the sheeting was also salvaged after the piers were completed. Divers with underwater torches cut off the piling in the main piers at minus 21, and in the flanking piers at minus 15.5.

Large Tremie Pours

An air lift cleaned out the mud and silt from the bottom of the pre-excavated cofferdams in preparation for the placing of tremie-concrete seals. In the main piers these seals are 15 feet thick, from minus 40 up to minus 25; the south and north main piers, respectively, contain 1,633 and 1,719 cubic yards of concrete. Each of the flanking pier structures contains 310 yards of tremie concrete, 14 feet thick, for the seal. The timber foundation piles in all the piers extend 5 feet into the tremie concrete.

All concrete for the bridge—pile caps, piers, and deck—was transit-mix, supplied by the Colonial Sand & Gravel Co. from its plant at Far Rockaway on the Long Island mainland, only a few miles from the north bridgehead. Sand and gravel were used for the aggregate, while the cement came from three sources—Lehigh, North American, and Whitehall. For the large pours, as many as 15 truck mixers of 6 and 9-yard capacity delivered the ready-mix concrete to the job. Delivery to the north bridgehead took only 20 minutes, but the trucks required 2 hours to reach the south abutment. The vehicles with their contents were too heavy to cross the existing Atlantic Beach Bridge, and were forced to detour east along the south shore of Long Island, then south and west over causeways to Long Beach to reach the eastern point of the long barrier reef. Atlantic Beach is at the extreme western end of the offshore island.

To reach the piers on the south side of the channel, the trucks backed down a ramp that had one end resting on the shore bulkhead and the other on a car float of the type used for moving railroad cars around New York harbor. The ramp took care of the tide movements, and the car float was big enough—240 feet long x 30 feet wide—to accommodate six truck mixers at a time. It was held firmly in place with anchors and heavy cables.

Concrete Handling

Because of the longer approach spans on the north side of the bascule pier, the car float alone did not reach the cofferdam. So a 150-foot timber work trestle, with a 10-foot roadway, was erected out from the shore on 3-pile bents, and the car float was stretched out beyond it. A ramp connection was made between trestle and float to take care of tidal movements. Pins held the ramp to the trestle, while the other end on the deck of the car float rested on rollers.

Truck mixers backed out to the far end of the car float and, two abreast, discharged their loads of concrete into Insley 1½-yard laydown buckets. The vehicles easily maneuvered around each other on the float, but the trestle was limited to one-way traffic. To speed these big seal pours, two tremie hoppers with elephant-trunk pipe were used at each pier. This required four floating rigs—two to support and maneuver the hoppers back and forth as required, and the other two for handling the concrete buckets. Two of the rigs handling the buckets were moored along the shore side of the pier, while the other two holding the hoppers were positioned on the channel side of the cofferdam.

Usually a pair of barge-mounted Koehring 605 cranes with 60-foot booms picked up and emptied the buckets. For the hopper handling, a similar rig was available, as well as a Wiley 75 Whirley



C. & E. M. Photo

A workman throws a ¾-inch red-hot rivet to the catcher, for a guardrail bracket connection along the east side of the Atlantic Beach Bridge.

with an 85-foot boom, or the No. 41 derrick boat. The latter rig has a steel hull, an oil-burning boiler, and an A-frame supporting an 85-foot boom.

With this somewhat unusual setup, tremie concrete was placed at an aver-

age rate of 85 to 90 yards an hour, and the seals on the main piers were completed within 20 hours. During this period the channel was closed to navigation because of the position of the two outside floating rigs.

Pier Work

Once the seals were poured the cofferdams were dewatered, and the rest of the concrete in the piers was placed in the dry. Wooden forms were built of 1-inch sheathing, backed with 2 x 6 studs and double 2 x 6 wales, and held together with Richmond ties. Both Mall and Ingersoll-Rand pneumatic vibrators were used to vibrate the concrete as it was placed. Curing was done with water. Bethlehem Steel Co. furnished the necessary reinforcing.

Top of concrete in the main bascule piers is at elevation 5. Above that are the steel trunnion tower frames. The dual structures in the flanking piers go up to elevation 29.34. Piers are protected with a timber fender system, and pile clusters were also driven both upstream and downstream of the concrete-pile bents. Individual piles are faced with treated-timber planking.

Pier construction was completed by July 1, 1951, but steel erection had started two months before that. Fab-

(Continued on next page)

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Bascule-Span Bridge Has 6 Traffic Lanes

(Continued from preceding page)

rection and erection of the superstructure had been sublet to the Phoenix Bridge Co. of Phoenixville, Pa. Most of the steel was shipped by rail to Brooklyn, and then trucked to the site. The heavy members for the bascule span,

however, were delivered to the job by barge rather than by truck.

Steel Superstructure

The ten 36-inch WF steel stringers laid over the caps to support the deck are on 7-foot 2½-inch centers. Truck cranes erected the first span at each end of the bridge, and then set up on this steel two 40-ton stiffleg derricks for erecting the rest of the superstruc-

ture out to the bascule on each side. Both derricks are similar in construction, with 16-foot-diameter bull wheels, 38-foot 3-inch masts, and a pair of 40-foot legs tied down and back with blocks of cast iron. They have 70-foot booms with a capacity of 40 tons on a 50-foot radius. Both are operated with three-drum hoists—one an American and the other a Clyde—driven by Waukesha 100-hp gasoline engines.

The four main girders for the bascule span are 95 feet long and weigh 62 tons. They were fully assembled, brought to the site by barge, and lifted into position by the Colossus, one of Merritt-Chapman & Scott Corp.'s large floating derricks. For the bascule steel, 1-inch rivets were used, but the rest of the superstructure was tied together with ¾-inch rivets. The fourth and last of the four main girders was lifted into place on September 8, 1951.

Two four-man gangs did the bulk of the riveting, using Boyer hammers. Air for each crew was supplied by a Schramm 315-cfm compressor. A small

amount of steel was welded instead of riveted. The deck of the bascule span consists of open steel grating.

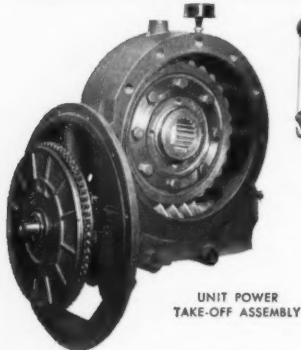
Concrete Deck Slab

The rest of the bridge deck is a 7½-inch concrete slab with a 68-foot clear roadway divided into six traffic lanes—two 12-foot lanes along the center, with two 11-foot lanes on each side reaching to the curb. For contrast, emulsified carbon black was incorporated into the upper 2 inches of concrete in the roadway slab, while white Universal Atlas cement was used in the concrete curb.

Forms for the deck slab were supported by the steel superstructure. Richmond Hanger Frame-Tys were slipped over the top flange of the stringers on 4 to 4½-foot centers. They held up double 2 x 6 wales on each side of the beam, which in turn supported 2 x 6 joists laid out transversely to the axis of the bridge on 18-inch centers. Over these joists went 1-inch tongue-and-groove sheathing, made up in 3-foot-

(Concluded on next page)

1 of 10 Reasons Why UNIT is a Better Machine



UNIT POWER
TAKE-OFF ASSEMBLY

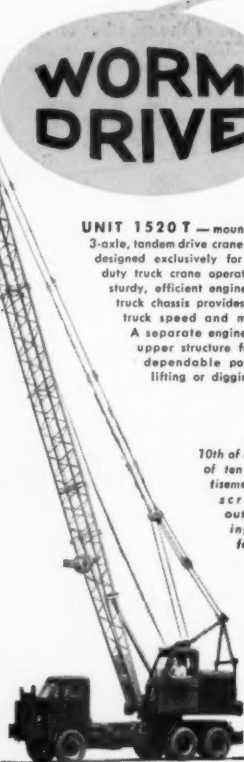
The power take-off assembly in all UNIT equipment is a complete package of silent efficiency and concentrated power. A rigid one-piece, cast steel case houses the main worm drive, providing positive protection against damaging dirt or abrasives. An accurately cut, and precision ground, bronze worm gear operates in perfect alignment with a hardened and ground alloy-steel worm. Power is transmitted in an even, steady flow, and the reduction from engine speed to main machinery is accomplished in just one step. This method eliminates many wearing parts, minimizes friction losses, and prevents dissipation of power. A single-disc, friction-type, main drive clutch is also housed in this assembly, adding to the smooth flow of power, endurance, and better performance of every UNIT crane and shovel.

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UNIT 1520 T—mounted on a 3-axle, tandem drive crane carrier, designed exclusively for heavy-duty truck crane operation. A sturdy, efficient engine in the truck chassis provides motor-truck speed and mobility. A separate engine in the upper structure furnishes dependable power for lifting or digging.

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Branick Mfg. Co., Inc.

FARGO, N. D.



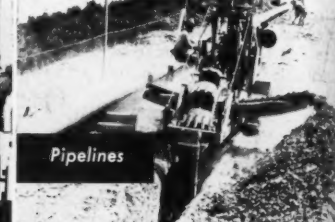
The Model TS (Twin Spreaders) handles the 5,000 lb. 36.00 x 54" 40-ply and all sizes down to 14.00 cross section. These Twin Spreaders are two separate units that can be wheeled up to the tire and spread it right where it stands for faster, easier inspection, skiving, buffing, cementing, building, inserting tubes and flaps, fitting and packing air bags. Air powered from your regular line, it spreads up to 3 ft. from bead to bead.



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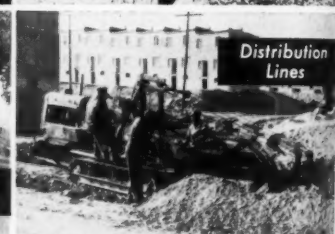
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wide panels. From steel stringer to steel stringer there were two panels with a 1-inch filler strip between them. The top of the upper flange was slightly higher than the deck form. Scaffolding for removing the forms was hung from the lower flanges of the stringers. The entire form assembly was dropped simply by turning the Hanger Frame-Tys. Reinforcing in the deck consists of a double mat of steel. On the south approach, the transit-mix concrete was discharged into buggies which distributed it to the forms, while on the longer north side of the bridge a Rex Pumpcrete placed the concrete.

Land Approaches

At the north end of the bridge, Bannister Creek emptying into Reynolds Channel was diverted to make room for the new toll plaza. The stream is carried under the plaza in a concrete box culvert—30 feet wide x 18 feet high x 220 feet long—and can accommodate small boats. Material to provide fill for this approach area was dredged both from Bannister Creek and Reynolds Channel. Slattery Contracting Co. of Elmhurst, Long Island, handled the earthwork and roadway items under a subcontract.

The new Atlantic Beach Bridge (the old one is to be dismantled) will be a link in the proposed Nassau Expressway, which will eventually extend north from Lawrence and join the Southern (Belt) Parkway near Van Wyck Expressway. This proposed 6-mile route will provide a direct connection between the various parkways on Long Island and the seashore resorts of Atlantic Beach, Long Beach, Lido Beach, and Point Lookout.

Quantities and Personnel

The major items in the bridge and approach contract included:

Embankment in place	485,000 cu. yds.
Precast-concrete piles, 24-inch	14,300 lin. ft.
Timber piles	94,900 lin. ft.
Steel H-piles in abutments	7,000 lin. ft.
Monotube piles in abutments	10,500 lin. ft.
Steel sheet piling, left in place	34,000 sq. ft.
Tremie concrete	4,592 cu. yds.
Other concrete	18,770 cu. yds.
Concrete pavement in approaches	2,120 cu. yds.
Reinforcing steel	1,378 tons
Portland cement	36,500 bbl.
Structural steel	2,390 tons

At the peak of construction, Frederick Snare Corp. employed a force of 180 on the project. Key personnel included George Reider, Project Manager; Thomas C. Barnett, Engineer; and Anthony Kelly, Superintendent.

The Phoenix Bridge Co. averaged 40 men on the steel erection under Jim Bason, Superintendent. Hardesty & Hanover of New York, designer of the bridge, was represented on the construction by Lloyd I. Monroe, Resident Engineer. Lt. Gen. C. W. Wickersham is Chairman of the Nassau County Bridge Authority which will operate the new Atlantic Beach Bridge.

Full-Hydraulic Control

Simplifies Crane Operation

A folder featuring the Speedomatic full-hydraulic control system is issued by Link-Belt Speeder Corp., 201 Sixth St., S. W., Cedar Rapids, Iowa. The company points out that the system eliminates up to 150 parts, steps up production by 25 per cent, makes the machine more maneuverable, and permits the operator to "feel" the load all the way. Full-hydraulic control, adds, involves no air or vacuum devices, greatly reducing the possibility of jerky and balky operation.

This literature may be obtained from the company, or by using the Request card at page 16. Circle No. 120.

Cleaver-Brooks Ups Holtz

Harold F. Holtz has taken over the post of Sales Manager of the Boiler Division of the Cleaver-Brooks Co., Milwaukee, Wis., manufacturer of heat-generating equipment. Mr. Holtz was

formerly Advertising and Marketing Manager for the company and for the past few months he has been actively engaged in sales development in the east. He succeeds R. J. Tutsch, who resigned his position to form a new partnership for the handling of Cleaver-Brooks equipment in the Milwaukee area.

Death of V. M. Dobeus

V. M. Dobeus, President and General Manager of Tractomotive Corp., Deerfield, Ill., died on April 8 at the age of 50.

Mr. Dobeus, together with Paul B. Cochran, founded Tractomotive in September, 1945, to manufacture allied equipment for crawler and wheel tractors. The firm moved into its plant at Deerfield in November, 1948, and shortly after that Mr. Dobeus became sole owner. He served recently as a member of the Tractor and Allied Equipment Industrial Advisory Committee of the National Production Authority.



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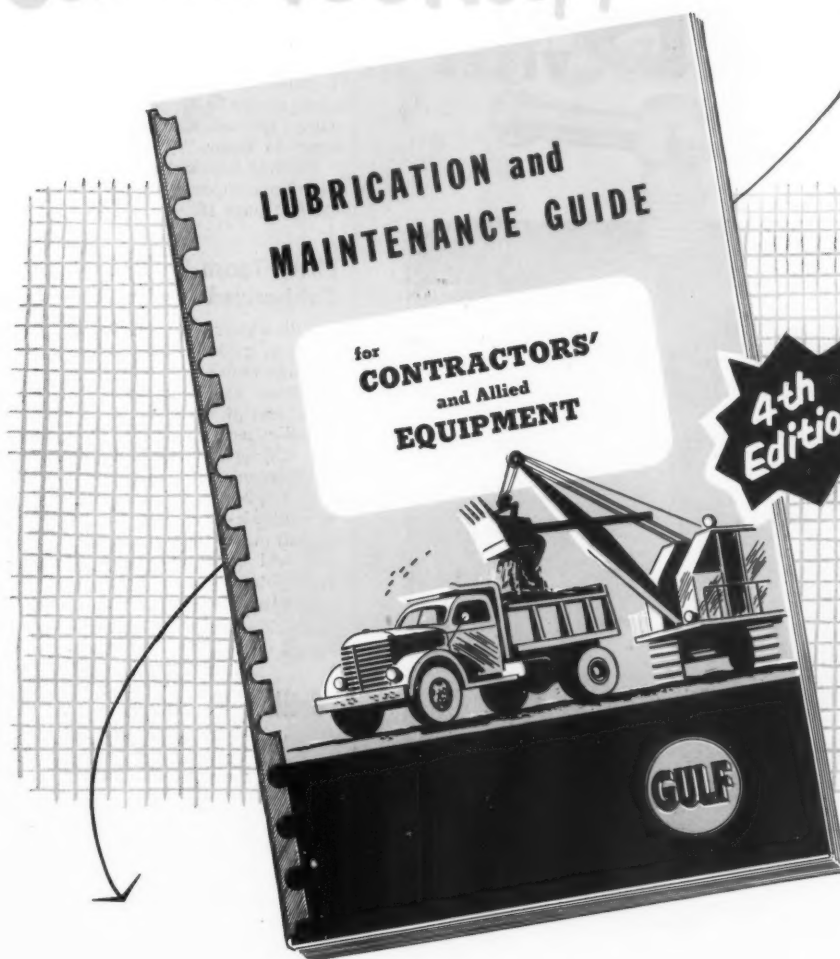
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New Steel Roadway For Loading Areas

A steel roadway for loading areas, said to require little or no maintenance, has been developed by Irving Subway Grating Co., 27th St. at 50th Ave., Long Island City, N. Y. It is open-mesh steel grating with a 3½-inch spacing between bars. The company reports that the roadway has been tested daily for the past four years under maximum truck-loading conditions at the Irving plant.

A section of the Irving test loading area is on filled-in ground, unsuitable for concrete surfacing. The company had suffered expensive loading delays in repairing road washouts and sinking after rains. In 1948 the test steel roadway strip was put in as the answer to this problem. Grating panels were laid over an area 25 feet square. The interstices were filled with sand and then surfaced with asphalt road oil as a binder.

The company claims that the road-



An Irving employee shows how the test roadway strip at the company's loading area has stood up after four years of constant use. The wheel is that of a 5-ton tractor.

way today is as solid and efficient as the day it was laid. It has never been

repaired and the ground has not sunk. The heaviest vehicles and loads can be sustained on the roadway grid, including cranes and tractors, according to Irving officials.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 108.

New Masonry Paint

A one-coat oil-base masonry paint is offered by Surface Protection Co., 16803-C Euclid Ave., Cleveland, Ohio. For application both above and below grade, exterior and interior, it is said to resist normal hydrostatic conditions on interior below-grade walls.

Bloc-Seal may be applied to either dry or damp surfaces, and is designed to cover rust stains and discolorations permanently, and to resist lime, alkali, salt, mold and fungus. It may be applied to new masonry or old surfaces previously treated with water-cement-type paints. No sizing is necessary. Preparation consists of brushing loose flakes and particles of old paint off the surface to be painted.

One gallon covers from 100 to 250 square feet depending upon porosity and surface irregularities. For spray application, it may be thinned and applied according to standard practices. Drying time is 4 to 6 hours.

It comes in white, buff, stone gray, ivory, pale green, slate gray, and brick red, and is packaged in 55, 30, 5, and 1-gallon quantities. Applications include cinder block, cement block, brick, stucco, tile, asbestos siding, and poured-concrete forms.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 126.

Firms Team Up to Develop Rubberized-Asphalt Pavement

With a view to developing its pioneer work on rubberized surfaces for playgrounds and other recreational areas, Goodyear Tire & Rubber Co., Akron, Ohio, has given distribution rights on its pelletized rubbers to Berry Asphalt Co., Chicago, Ill., and Magnolia, Ark. In addition to the rubber-playground program, both companies are interested in synthetic-rubber powders for use in asphalt mixes for highway construction, and will continue jointly to develop their potential uses.

Goodyear's pelletized rubber is being

marketed as Rub-A-Mix, and is said to be suitable not only for playgrounds, but as a surfacing material for walks, bridge floors, railroad crossings, and other installations requiring a resilient, noiseless, waterproof, and flexible surface.

Further information on Rub-A-Mix may be secured from either of the two companies. Or use the Request Card at page 16. Circle No. 142.

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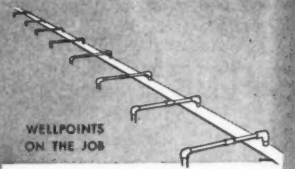
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Drott Skid-Shovels now come in 1½, 2, and 3-yard models for International TD9, 14A, and 18A tractors. Production of a Skid-Shovel for the TD6 is due in the fall.

New Front-End Loader With Crowding Action

A front-end loader for use with International tractors is announced by Drott Mfg. Corp., 3481 W. Wisconsin Ave., Milwaukee 8, Wis. The Skid-Shovel comes in 1½, 2, and 3-yard models which operate from the TD-9, TD-14A, and the TD-18A.

The bucket features a crowding action for getting a heaped load. After loading it rolls back as much as 28 inches before lifting the load, thus preventing any slip of the heap. The force of this prying action, the company points out, is transmitted through the loader shoes into the ground instead of into the tractor.

Loads are transported with the bucket shoes skidding on the ground. This feature gives the operator good visibility, maintains better balance, and eliminates carry strain. An indicator on the bucket control arm permits the operator to make small adjustments of his depth of cut.

The company claims that hydraulic shocks are reduced two-thirds by a pressure line running from the main lift rams to a special spring. This puts the hydraulic system under spring tension and lowers tractor wear and tear.

The Skid-Shovel has no hose or pipes to restrict the operator's movement. All hydraulics are fully enclosed and protected. The rear end is free for mounting auxiliary equipment. Other features include the magnetized oil-gage dip stick which removes foreign matter from the oil, and reversed action of the bucket control cylinders.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 151.

Steel Lacing Co. Personnel

Due to the retirement of Creighton L. Garesche, through ill health, two personnel changes have occurred in Flexible Steel Lacing Co., Chicago, Ill., manufacturer of belt fasteners for joining conveyor and transmission belts.

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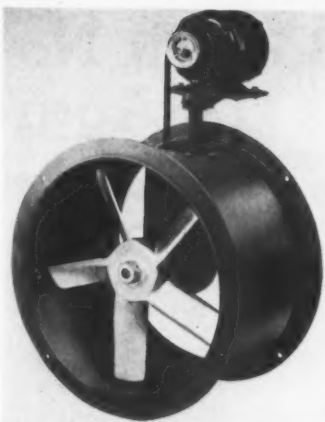
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Pennsylvania-New Jersey area; and Hugh L. Coats, Jr., who has spent a year and a half in Flexible Steel's factory, succeeds Mr. Beach as Sales Representative for the north central states.

New Ventilating Fan

A fan for exhausting dangerous or obnoxious fumes, dirt, heat, and smoke, and for other applications where it is desirable to have the motor outside the air stream, is announced by Standard Electric Mfg. Co., Inc., West Berlin, N. J. The unit meets UL specifications for spray booths and is available with explosion-proof, enclosed, or open-type motors.

Features cited by the company include sealed SKF bearings in readily replaceable flange construction, double-angle motor support to minimize vibration, adjustable motor base for belt take-up, and a heavy cast-aluminum fan blade in sizes from 18 to 42 inches. Motors are available from ¼ to 7½ hp. Further information may be secured



Standard Electric's new fan for exhausting fumes, dirt, heat, and smoke. Blade sizes range from 18 to 42 inches.

from the company. Or use the Request Card at page 16. Circle No. 107.

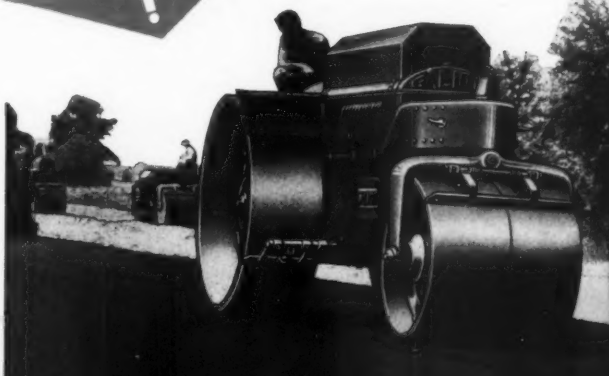
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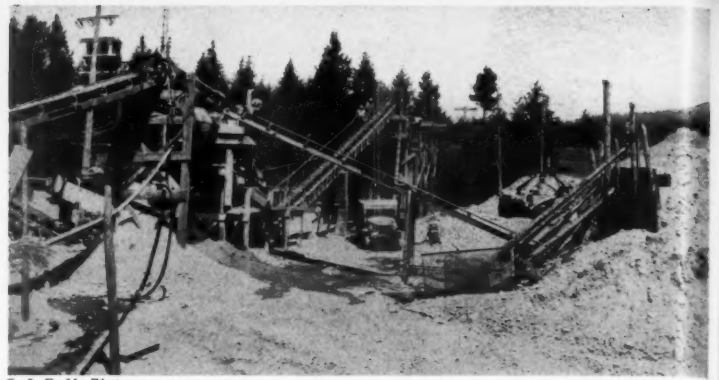
Output High as Contractor Beefs Up Shop-Made Outfit Which Produces Aggregates for Albeni Falls Dam

• AT Albeni Falls Dam, Idaho, a dirty gravel pit 150 feet above the nearest water failed to slow an enterprising subcontractor specializing in the production of concrete aggregates. As a result of the showing made by Curtis Gravel Co. of Spokane, the prime-contract firm of Donovan-James started placing the first concrete in the dam early last August.

Speed was important to the Seattle district office of the Corps of Engineers, designer of the \$31,070,000 project. Planned for flood control and to firm

up the hydroelectric output of dams farther down the Columbia River system, the Albeni Falls Dam was authorized, designed, and put under construction in less than a year.

The dam will be a gravity structure composed of two concrete sections tying a large granite island to the two granite shores of Pend Oreille River. One of the concrete sections is a spillway, while the concrete powerhouse ties the island to the right abutment. The dam is 2 miles upstream from Newport, Wash., about 45 miles



C. & E. M. Photo

The scrubber and screening parts of the Curtis aggregate-production plant.

northwest of Coeur d'Alene, Idaho, and is about 838 miles above the mouth of the Columbia River.

Curtis Gravel Co. produced the aggregates for the spillway section only, since the powerhouse contract still re-

mains in the future. It turned out about 60,000 cubic yards of aggregate in approximately 3 months. This included about 20,000 cubic yards of sand—with the remainder gravel graded from 3-inch down.

Dirty Pit

The pit which contained the aggregates was situated about a mile upstream from the dam, on the right shore, on an ancient geological shelf 150 feet above the river. Test pits showed the material to be suitable, but there was plenty of dirt and other decontaminable material surrounding the rounded rock particles. The rock would be suitable for concrete only if this problem of dirt could be solved.

Curtis Gravel Co. first set up a pilot plant capable of producing 100 tons per hour. When it failed to solve the dirt problem, a shop-made scrubber unit was installed, and wash water was piped 800 feet and lifted 150 feet. The scrubber worked so successfully that the plant output went up to 200 tons an hour and stayed there.

The pit area was relatively small, and about three-fourths of the raw material was pushed direct to the initial feeder hopper by a Caterpillar D8-mounted dozer. An 8-yard LeTourneau Carryall also was used, mostly for longer haul work from one isolated corner of the pit. These machines dumped the material over a 15-cubic-yard timber hopper, equipped at its base with a Pioneer variable-speed reciprocating plate feeder.

A 24-inch belt conveyor 94 feet long carried this raw material up to the 40-inch x 12-foot scrubber, which had been shop-built from an old screen frame. It was driven by a 15-hp electric motor. Water boosted along by a 40-hp Fairbanks-Morse centrifugal pump and two smaller 2½ and 2-inch boosters entered the back end of the scrubber.

The objectionable dirt and other decontaminable material was carried off from the scrubber in a 6-inch line, leading to a waste ravine and eventually back to the river.

From the scrubber, the material passed by conveyor belt to a double-deck 4 x 12-foot scalping screen. The upper deck of this screen was ¾-inch mesh; the lower, ½-inch. Throughs from the bottom deck passed to a double Eagle sand screw in a washing tank, which removed the last trace of

(Continued on next page)

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dirt from this material. Dirty water from the sand washer joined the 6-inch pipeline from the primary scrubber.

Rock retained on the scalping deck then passed by conveyor to the top of a 5 x 10-foot 3-deck sizing screen. A 100-foot 24-inch Pioneer conveyor led up to this screen. The upper deck carried 3-inch mesh, and oversize rock retained on this deck passed off into a waste pile nearby. The second deck was split between 1 3/4 and 1 1/2-inch mesh. Retained rock on this deck was conveyed off to the 3-inch-cobble pile.

The bottom deck, equipped with 7/8-inch mesh, retained the 1 1/2-inch size of aggregate and passed the 3/4-inch material. Each of these sizes of material was sent to its respective bin by conveyor belt. A 20-yard surge bin was provided for each size. Two 6-yard dump trucks, one a Studebaker and the other a GMC, hauled the finished material to stockpiles about 250 feet away from the plant area. An Eimco 1 1/2-yard RockerShovel mounted on a Caterpillar D4 loaded out the material to trucks when concrete placing got under way.

The 4-inch water pump at the river was mounted on a timber frame so that it would be adjustable to river stages. Another plant improvement was the use of a D8 and dozer to spread the sand while it was still wet, to avoid segregation. There was a slight lack of fines in the raw-run pit, so a small amount of blending sand was trucked in and fed to the plant input at the entrance to the primary scrubber.

When the job was visited the shop-built washing-screening plant was producing at the rate of 200 tons an hour.

Specifications for concrete sand were as follows:

Size Screen	Per Cent Passing	Retained
No. 4	95-100	0-5
No. 8	80-90	10-20
No. 16	55-75	25-45
No. 30	30-60	40-70
No. 50	12-30	70-88
No. 100	3 1/2-10	90-96 1/2
Fineness modulus: 2.40 to 2.90		

Specifications for the various sizes of concrete aggregates were as follows:

Size Screen	No. 4 to 3/4 Per Cent Passing	3/4 to 1 1/2-inch Per Cent Passing	1 1/2 to 3-inch Per Cent Passing
6-inch	100	100	100
3-inch	100	90-100	90-100
2-inch	100	20-55	20-55
1 1/2-inch	100	90-100	0-10
1-inch	100	20-45	0-5
3/4-inch	90-100	0-10	0-5
3/8-inch	30-55	0-5	0-5
No. 4	0-5	0-5	0-5

Concrete Placing

While concrete placing had not begun when the project was visited, Donovan-James had the operation well planned and the pours scheduled. It expected to truck the various sizes of aggregates to a Johnson 400-ton automatic batch plant, set up on the right abutment. Cement and water are added to the dry batch in two 2-yard Smith mixers mounted on a lower platform of the plant. The fresh concrete is handled in 2-yard Gar-Bro buckets and trucked from the plant to a cableway spanning the distance from the right shore to the center island.

The buckets are then handled by a crawler crane from that point to the pour, with possibly a secondary trucking step necessary. The concrete is placed in wooden forms, prefabricated at a central carpenter yard. The usual vibration and water curing round out

the placement program. Concrete placing during the summer months was done in late evening and night to reduce the temperature to a minimum.

Project Background

The Albeni Falls site caught the early attention of engineers surveying the Columbia River Basin because of its solid granite foundation and abutments, and the fact that a dam there would effectively control Pend Oreille Lake, one of the largest natural lakes in the west. The project was authorized by Congress in May, 1950, and the initial appropriation of \$2,900,000 was made in September of that year. Ground was broken for the first construction on January 26, 1951.

First-stage construction started when Macco Corp. of Paramount, Calif., started blasting and removing rock from the right channel for diversion purposes. The aim was to provide sufficient additional capacity in this channel to balance the capacity lost when the south and middle channels



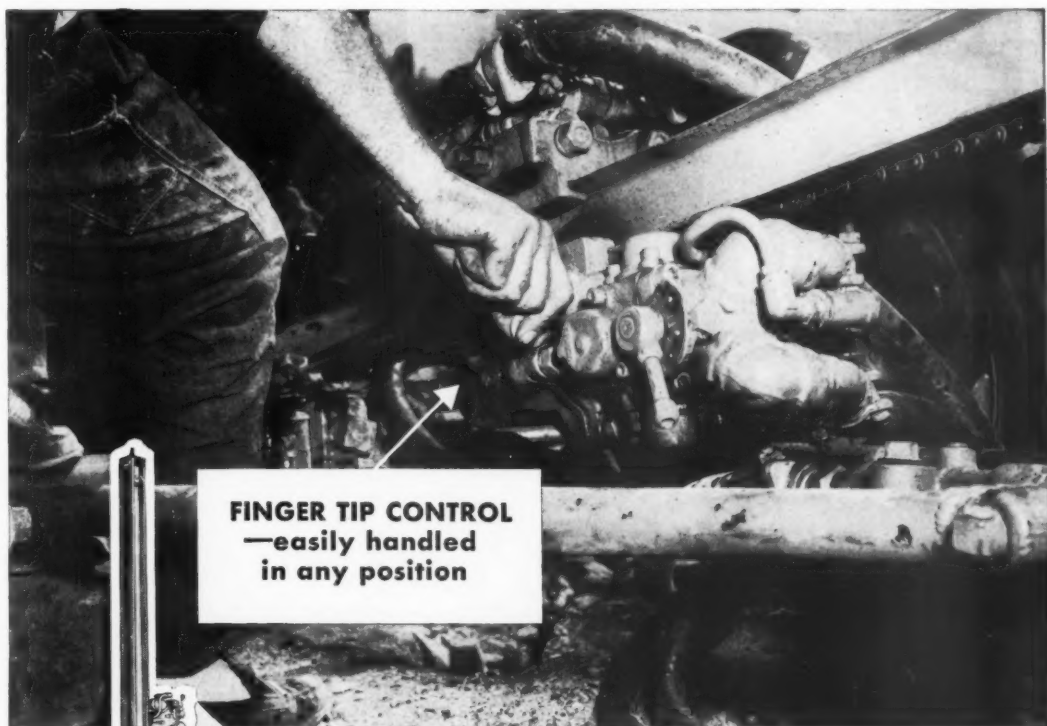
C. & E. M. Photo

Clean finished aggregate for Albeni Falls Dam is on its way to the final sizing screens. Plant Operator Walt Smith is on the walkway.

were closed by cofferdams. The success of this plan was virtually proved during the 1951 high water. By check-

ing gages on the river and the lake, engineers established the fact that the

(Concluded on next page)



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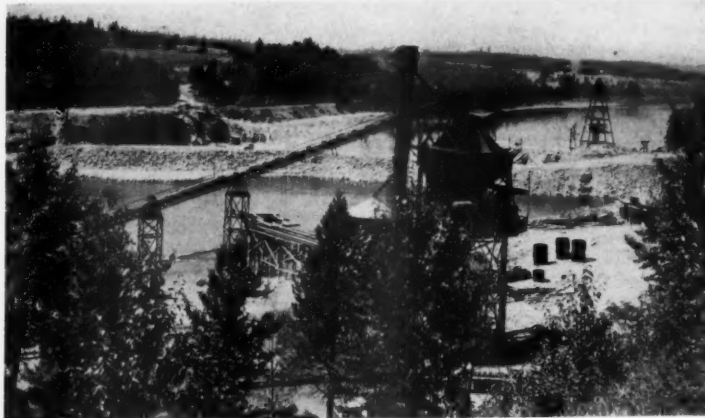
Bad Pit No Problem To Aggregate Maker

(Continued from preceding page)

rating curve at the dam site was the same as before construction began.

A principal feature of the project is the storage gained in Pend Oreille Lake. The lake has a surface area of nearly 150 square miles and will provide 1,140,000 acre-feet of usable water storage annually. This storage will be gained not by raising further the level of the lake, but rather by retaining a part of the annual spring floodwaters to provide a moderate lake level through the late summer, when otherwise the lake would recede to a low elevation. The dam will not cause any lands to be flooded that were not flooded under natural conditions, according to the Corps of Engineers.

Upon completion of the project, limited-control operation of the spillway dam will afford a reduction of flood levels in Pend Oreille Lake up to 1.5



C. & E. M. Photo

Albeni Falls Dam, from the public observation point overlooking the site. In the foreground is the Johnson batch plant.

feet for all floods up to and slightly above the 1948 high water.

The spillway section is approxi-

mately 90 feet high and 750 feet long, with the powerhouse section about 330 feet long. The spillway is a straight

gravity structure. The hydroelectric installation will consist of three Kaplan turbines, driving generators with a total rating of 42,600 kilowatts. Another 150,000 kilowatts of nominal prime power will be added to the northwest's regional system, according to the Engineers, when storage is released through the downstream dams existing, authorized, and under construction.

The Corps of Engineers claims that Albeni Falls Dam is a multiple-purpose project benefiting power, flood control, navigation, recreation, and conservation. Further claims are made that the estimated annual monetary value of these benefits is to be 2.65 times the annual cost of the project. The Corps of Engineers says that this cost-benefit ratio is the highest of all the major multiple-purpose developments considered on the Columbia River system.

Personnel

Corps of Engineers operations are all under the general supervision of Colonel John P. Buehler, District Engineer, with James F. Grafton as Resident Engineer.

A. R. Bacon, Project Manager, heads up the field organization of Donovan-James. The unusually efficient aggregate-production setup was headed by Jack Edwards, General Superintendent, with Walt Smith as Plant Operator.

Pennsylvania Roadside Rests

Fourteen new roadside rests along the highways of Pennsylvania are part of the Highway Department's plans for this season. These rests were originally authorized by the Legislature in 1945. Since then, 15 have been completed. The ultimate goal is one in each county.

The roadside rests, which are situated in pleasant wooded areas, are fitted up with fireplaces, water, and toilet facilities. Registers have been installed for comments by picnickers, and all have been liberal in their appreciation.

Though the expenditure on each rest area is limited to \$3,500, it is possible to complete the projects within this budget due to the generosity of veterans', civic, and other organizations, as well as that of individuals who donate suitable sites.

U. S. Plywood's New Units

As part of a program to expand distribution, United States Plywood Corp., New York, N. Y., has opened the two latest in its chain of 38 sales and distribution units throughout the country. The two new units are at West Pittston, Pa., and Columbus, Ohio.

Manager of the West Pittston warehouse is Charles A. Mack, Jr. George E. Young, formerly of U. S. Plywood's Buffalo, N. Y., unit, manages the new Columbus branch.

Easy shifting helps drivers get the most out of Eaton 2-Speeds



EATON 2-Speeds are easy to shift at any speed—uphill or downhill. Drivers will use all of the gear ratios provided by Eaton 2-Speeds—the right ratio for every road and load condition. Extra maneuverability, coupled with positive control at all times, means less wear and tear—not only on the driver but on the engine, the axle itself, and all power transmitting parts. Appreciable savings are realized in lower operating expense, reduced maintenance cost, and longer truck life. Your truck dealer will be glad to explain Eaton's simplified shifting, and show you how with Eaton 2-Speeds your trucks will haul more, faster, longer, at lower cost.

EATON 2-Speed Truck AXLES

Axle Division

EATON MANUFACTURING COMPANY
CLEVELAND, OHIO



PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

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STEEL SPRING WIRE ROAD BROOMS
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WIDTH 6 INCHES—IT'S DIFFERENT
ASSEMBLE YOUR OWN—IN ANY SHAPE
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MADE WITH KILN DRIED 6" WIDE
HARDWOOD AND HEAVY SPRING STEEL
WIRES TRIPLE OUT EACH HOLE.
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10-FOOT LENGTH
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RUNNING FOOT F.O.B. K.C., MO.
NOTICE! Our 15' length Unit Drag 3' wide
with the two bolts that fits your frame,
still \$3.50 ea.

SINCE **VAN BRUSH MFG. CO.** 1948
327 SO. WEST BLDG., KANSAS CITY 8, MO.

New Maintenance Guide

For Track-Type Tractors

Much of the life in your Caterpillar diesel tractor depends on you, according to the new booklet "Maintenance Guide for Track-Type Tractors". Four-color cartoons tell what happens when an owner and service technician compare job notes. The two men discuss basic methods of making tractors last longer and do better work at lower cost.

Simple maintenance, the technician points out, extends the life of tracks, steering mechanism, brakes, and clutches. In addition, proper care of the lubrication, hydraulic, cooling, air, fuel, and exhaust systems results in better performance. Rebuilding of worn

parts is also featured.

This literature may be obtained from the Caterpillar Tractor Co., Peoria 8, Ill., or by using the Request Card at page 16. Circle No. 152.

Book on Design Short Cuts

A structural-design handbook offering fast graphical solutions to many concrete and steel problems has just been published. Written by Fred C. Whitney, "Short Cuts in Concrete and Steel Design" presents 84 pages of charts, graphs, tables, and typical examples of structural design.

The concrete section features one-step solutions of column design problems, beam and slab charts, and lists

of bar areas. Footings and continuous beams are also covered. Crane girders, lintels, plate girders, and similar subjects are included in the steel section.

The pages are 8½ x 11 and lie flat wherever the book is opened. The price is \$3.50 and the book can be purchased from Fred C. Whitney, 16502 Ward Ave., Detroit 35, Mich.

New Blade Company Opens

Bucyrus Steel Products, a recently organized firm, has moved into its new factory at 260 E. Beal St., Bucyrus, Ohio, and is now in full production of its blades and cutting edges for motor graders, bulldozers, maintainers, and snowplows. Arno W. McGraw is Presi-

dent of the company, and the blades will be marketed through construction-equipment distributors.

Crawler-Crane Catalog

A catalog describing the ¾-yard-capacity American crawler crane is available from American Hoist & Derrick Co., 63 S. Robert St., St. Paul 1, Minn. It includes action photos; points up the availability of interchangeable fronts—crane, shovel, dragline, or pull shovel; and lists over-all specifications. Each attachment is briefly described.

This literature may be obtained from the company by requesting Catalog No. 700-G-21, or by using the Request Card at page 16. Circle No. 155.

There is a GM Diesel Engine Distributor Near You

ALABAMA—Birmingham
ARMSTRONG EQUIPMENT CO.
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ALABAMA MACH. & SUP. CO.

ARIZONA—Phoenix
O'CONNELL BROTHERS, INC.

ARKANSAS—North Little Rock
LEWIS-DIESEL ENGINE CO.

CALIFORNIA—Berkeley, Fort Bragg
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ANDERSON-O'BRIEN CO.
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MOORE EQUIP. CO., INC.

COLORADO—Denver
COLORADO BUILDERS' SUPPLY CO.
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CONNECTICUT—Hartford
HOLMES-TALCOTT, INC.

FLORIDA—Jacksonville, Miami
GENERAL MOTORS CORP.
Florida Diesel Engine Sales

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BLALOCK MACH. & EQUIP. CO.
Savannah
MORGANS, INC.

IDAHO—Boise, Idaho Falls, Twin Falls
SOUTHERN IDAHO EQUIP. CO.

ILLINOIS—Bellwood
D. D. KENNEDY, INC.

INDIANA—Lawrence
FLESH, MILLER TRACTOR CO.

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STEPHENS-JONES, INC.

KANSAS—Grand Bend, Wichita
DIESEL EQUIPMENT CO., INC.

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LOUISIANA—Grand Island, Harvey
GEORGE ENGINE CO., INC.
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NEW YORK—Buffalo
BROCK TRACTOR COMPANY, INC.

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GREAT LAKES DIESEL CO.

Columbus
CENTRAL OHIO TRACTOR CO.

Steubenville
RAY C. CALL COMPANY

GM Diesel Case History No. 517-28
USER: U.S. Steel Company--
McDonald, Ohio, slag dump.
INSTALLATION: 4 Euclid 15-ton rear dumps
powered by GM 6-71 Diesels. 2 Haiss loaders
powered by GM 3-71 Diesels. Allis-Chalmers
HD-5 tractor powered by GM 2-71 Diesel.
PERFORMANCE: Each of the engines in the
Euclids has operated 11,000 hours to
date without overhaul.* 3 Euclids
hauling to crusher handle 2100 tons
per 10-hour day on 500 to 1000-yd.
haul cycles.* Piston rings
replaced in 3 engines at 10,000 hours.



THIS DIESEL has worked 11,000 hours without overhaul

Power users who standardize on General Motors Diesel for all equipment on the job, as U. S. Steel has done in this particular operation, can be sure of maximum return on their investment. GM Diesel's faster acceleration means more work output and smoother 2-cycle

operation means less wear and longer engine life. And, with most parts interchangeable, all Series 71 engines can be serviced with one small stock of basic parts. We're simply reporting what contractors and industrial users have told us when we say—

It pays to Standardize on

Write for booklet "A 50,000,000 Horsepower Insurance Policy" that tells you why.



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GENERAL MOTORS • DETROIT 28, MICHIGAN

SINGLE ENGINES . . . 35 to 275 H.P. MULTIPLE UNITS . . . Up to 800 H.P.

OKLAHOMA—Oklahoma City
DIESEL POWER COMPANY

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GUNDERSON BROS. ENGRG. CORP.

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FRANTZ EQUIPMENT COMPANY

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SOUTH CAROLINA—W. Columbia
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TENNESSEE—Chattanooga
NIXON MACH. & SUP. CO., INC.

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LEWIS-DIESEL ENGINE CO.

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STEWART & STEVENSON
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EQUIPMENT SUPPLY CO., INC.

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DIESEL POWER, INC.

UTAH—Salt Lake City
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HILL-MARTIN CORPORATION

VIRGINIA—Richmond, Roanoke
BEMISS EQUIPMENT CORP.

West Norfolk
WESTERN BRANCH DIESEL SALES &
SERVICE

WASHINGTON—Seattle
EVANS ENGINE & EQUIP. CO., INC.

Seattle
YUKON EQUIPMENT CO., INC.

Spokane
MODERN MACHINERY CO., INC.

WISCONSIN—Milwaukee
DROTT TRACTOR CO., INC.

WYOMING—Casper
COLORADO BUILDERS' SUPPLY CO.
(Equip. Div.)



The Kohler Model 90 power plant has a 3.6-hp rating at 3,600 rpm. It weighs 44 pounds.

New 3.6-Hp Engine

An engine with a 3.6-hp rating at 3,600 rpm has been announced by Kohler Co., Kohler, Wis. The K90 weighs 44 pounds and is compact, portable, and easy to start, the company says. It may be used for centrifugal pumps, portable saws, mowers, etc. Its mounting dimensions permit its use on present equipment as a replacement for an existing engine.

Features of the K90 are antifriction ball bearings at both ends of the crankshaft, and easily accessible breaker points which are dustproof and moistureproof and externally mounted for speedy servicing. The ignition system operates from a high-voltage crankshaft magneto designed to permit instant starting. All K90 models have a precision oil-bathed fly-ball governor, glass sediment bowl with fuel shut-off valve, rotating screen, muffler, and oil-bath air cleaner.

Variations of the basic K90 engine design are available in the K90P which is built for direct mounting with a threaded crankshaft and the K90R which is equipped with a 6 to 1 reduction gear.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 133.

Data on Carburetor Cleaner

New literature on Gumout carburetor cleaner is available from Pennsylvania Refining Co., 2686 Lisbon Road, Cleveland 4, Ohio. Gumout comes in a can and is suspended over the engine with a tube leading to the fuel line at

the carburetor. The engine is driven at all speeds as the solution cleans gum, sludge, and dirt from 16 troublesome passages. It can also be added to the gas tank to clean the fuel system.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 118.

Horn Field Sales

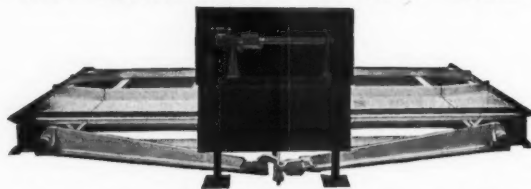
Norman D. Nichols, a graduate civil engineer, has joined the staff of A. C. Horn Co., Inc., Long Island City, N. Y., as Field Sales Supervisor. Mr. Nichols has specialized in the production of concrete and concrete products for industrial and home use and was for some time Resident Construction Engineer with the Portland Cement Association. His recent experience in the manufacture of precast-concrete wall panels utilizing air entrainment will help him to promote A. C. Horn's Ayr-Trap, an air-entraining agent for concrete and cement mortars. He will also act as a consultant and technical ad-

viser to the Horn sales staff in the building-unit field.

Walter R. Wakefield is another Field Sales Supervisor who has recently

joined A. C. Horn. He was formerly Manager of Industrial Product Sales for two well known companies specializing in floor maintenance.

WINSLOW—PORTABLE TRUCK SCALE "THE CONTRACTORS' SPECIAL SCALE"



For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site.
Capacities: 15-18-20-30 Ton—Write us for your nearest distributor

Mfd. by: **WINSLOW SCALE COMPANY**
P. O. Box 1198 Terre Haute, Indiana

A fleet of Street Maintenance Equipment

HUBER Maintainer
Serves Small City
Many Ways

A community of 3,000 residents, more or less, has nearly the same variety of street maintenance problems as larger cities—but usually the amount of money available for the job is limited.

Many communities are solving such problems by purchasing a Huber Maintainer because this single machine, with attachments, serves as a fleet of maintenance equipment.

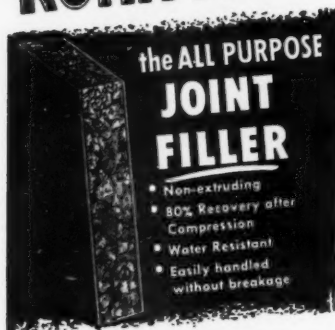
As a lift-loader, the Huber loads trucks, removes manhole covers and lays pipe. With a bulldozer attachment it does a variety of backfilling jobs. Its maintainer blade keeps alleys smooth and clean and handles grading jobs.

With other HYDRAULICALLY controlled attachments the 6,000-lb., 42½ H.P. Huber can serve as a highway mower, berm leveler, road planer, snow plow, broom or patch roller. Let your nearest Huber Distributor tell you more about the versatile Maintainer and how it can work for you.



HUBER MANUFACTURING CO. • Marion, Ohio, U. S. A.
Manufacturers of Huber Maintainers, Graders and Complete Line of Rollers

KORK-PAK®



Composed of cork granules bonded together with asphalt between two sheets of heavy asphalt-saturated paper, KORK-PAK is the lowest cost, non-extruding joint filler on the market. KORK-PAK is readily handled without breakage . . . and when used in conjunction with Para-Plastic Joint Seal, always provides complete joint filling and protection.

Write for details and prices on KORK-PAK. Catalog sent without obligation.

*KORK-PAK is one of the many Patented products developed for the Construction Industry by Serviced Products Corp.



SERVICED PRODUCTS CORP.
6051 W. 65TH ST. • CHICAGO 38, ILL.

Blacktop Pavement On Waterbound Base

Three Lanes on Each Side of Raised Concrete Divisor Strip
For Road that Approaches City Past Airport

• LAST year the Kentucky Department of Highways completed reconstruction of a 2.8-mile section of State Route 61, Preston Highway, on the southeastern outskirts of Louisville. The improved portion of the heavily traveled road lies just east of Standiford Field, the municipal airport. Originally 20 feet wide, the existing bituminous pavement had raveled along the edges so that its effective width had been reduced to 18 feet.

Located in Jefferson County, the northern 2.1-mile portion of the project has an urban cross section, while the remaining 0.7-mile stretch at the southern end consists of the conventional rural-type design. In the urban area the roadway is 64 feet between curbs, with opposing streams of traffic separated by a 4-foot-wide raised concrete divisor strip. Paralleling the curbs are 5-foot-wide concrete sidewalks. There are no walks in the rural section.

The new pavement consists of 3 inches of bituminous concrete, laid in two courses on a 12-inch waterbound-macadam base. George M. Eady Co. of Louisville was awarded the contract for grading, drainage, and paving on its low bid of \$517,000. Work got under way in August, 1950, and continued through the 1950-1951 winter with the drainage and curb and gutter items, as well as the grading. By May the job had progressed sufficiently to permit the laying of the waterbound-macadam base course which was finished in July. Blacktop paving had started in June, and was completed the middle of August. The finishing touches were put to the contract in September.

Grading

On the north the job began at Clarks Lane, just south of Eastern Parkway, U. S. 60, and ran south past the airport to Gilmore Lane. Two gaps were left in the reconstruction contract. One occurred where the tracks of the Southern Railway cross the highway on an overpass; at this point a four-lane concrete pavement had been laid for 900 feet on both sides of the structure. The other gap, 750 feet long, had been left for a connection to the Inner Belt Highway around Louisville when that by-pass is built. Including these gaps the project had a total length of 3.1 miles.

Earthwork, including roadway excavation and borrow, totaled over 35,000 cubic yards. For the grading and drainage work the contractor used equipment that included the following excavators: Northwest 1-yard, Bucyrus-Erie 22-B ¾-yard, Lorain ½-yard, and an Osgood ½-yard truck crane. Trucks were used for long hauls in the earthmoving, while short hauls were handled with a Caterpillar D8 tractor and 15-yard scraper combination, together

with a D7 hooked up with a LeTourneau 12-yard Carryall. An Adams motor grader shaped the subgrade.

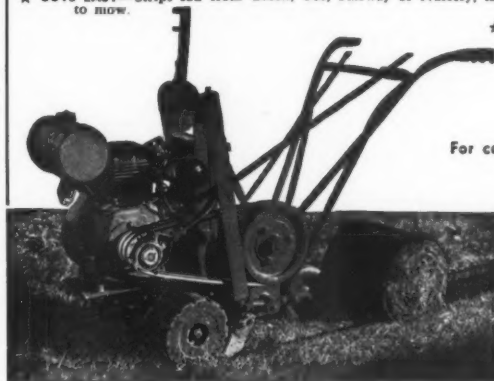
About 6,000 linear feet of the old pavement was left in place to serve as a base for the new surface. It was flanked on both sides by the new base course. The 4-foot-wide concrete divisor strip has a total thickness of 7 inches; of this dimension 4 inches is above the top of the pavement while the remaining 3 inches is in the ground. The concrete curb along the sides is L-

(Continued on next page)

CUT YOUR SOD-CUTTING WORRIES WITH THE RYAN POWER SOD CUTTER

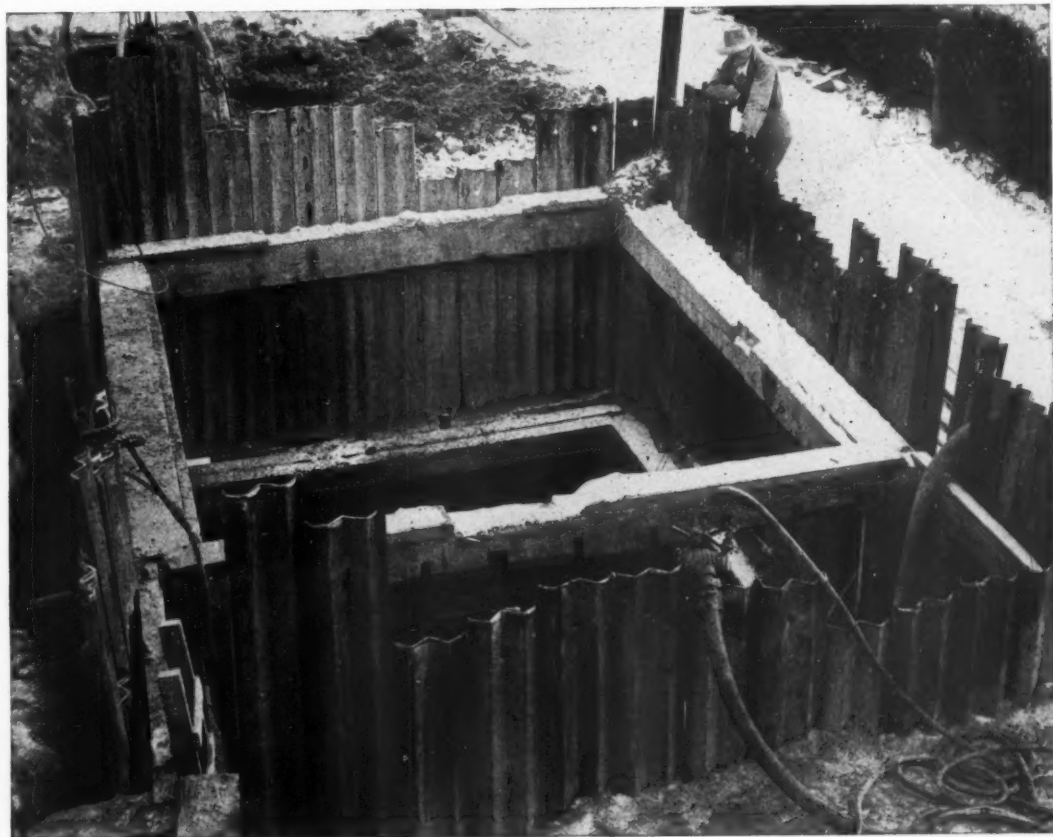
- ★ CUTS SOD CLEAN—The high speed action of the cutting blade insures cleanly cut root ends, which in turn stimulates healthy growth.
- ★ CUTS UNIFORM—Unique design of blade operating under drive wheel produces uniform cut sod.
- ★ CUTS EASY—Strips sod from Green, Tee, Fairway or Nursery, in little more time than it takes to mow.

- ★ CUTS ANYWHERE—The compactness of the RYAN Sod-Cutter makes for easy maneuverability in small or side hill areas.



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Shore Jobs and Profits WITH THIS SHEETING

On close-figured jobs you will find Armco Steel Sheeting a great help. It saves time, money and labor; helps cut job costs.

Driving is easy. The smooth metal surface and small displacement area of Armco Sheeting mean less resistance. Even 20-foot lengths can generally be driven to full penetration before excavating. And they drive true with either power hammers or hand mauls.

You also cut costs because Armco Sheeting can be used over and over again. It is simple to pull and there is less danger of damage during driving. Safe, uniform strength is assured. And Armco Sheeting is light in weight and nestable so that hauling, handling and storage costs are low.

To meet specific job conditions you can select the type you need, either flange or interlocking, in a wide variety of gages.

You'll find Armco Steel Sheeting a valuable, cost-cutting tool. Use it for trenches, cofferdams, foundations and other temporary or permanent installations. Write for complete data. Armco Drainage & Metal Products, Inc., 3102 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.



ARMCO STEEL SHEETING

DRILLING CONTRACTORS

Diamond and Shot Core Borings
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Grout Holes and Pressure Grouting
Foundation Testing for Bridges, Dams
and all Heavy Structures

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Manufacturers of Diamond and Shot
Core Drills, Accessories & Equipment

SPRAGUE & HENWOOD, INC.

Dept. C, Scranton 2, Pa.

Blacktop Pavement On Waterbound Base

(Continued from preceding page)

shaped with a 1½-foot gutter and a 6-inch curb, leaving a 1½-foot gutter adjacent to the blacktop surfacing.

Waterbound-Macadam Base

The 12-inch waterbound-macadam base is composed of three layers 1, 4, and 7 inches thick respectively from bottom to top. The 1-inch bottom lift or insulation course consists of No. 5 (¾ to 1-inch) crushed limestone and No. 10 (0 to ½-inch) limestone screenings to fill in the voids in the No. 5's. The two sizes are in about equal proportions, and have a total compacted thickness of one inch.

Over that is a single 4-inch compacted course of No. 1 (1½ to 3½-inch) crushed limestone. The upper 7 inches of the base is put down in two 3½-inch compacted courses of No. 2 (1½ to 2½-inch) crushed limestone. About 30 per



C. & E. M. Photo

An International KB-7 truck with an Anthony body feeds plant-mix for the Eady Co. job to a Barber-Greene Finisher.

cent of this upper 11 inches consists of No. 10 screenings to fill in the voids in the larger stone.

The gradation of the four sizes of stone used in the waterbound-macadam base was as follows:

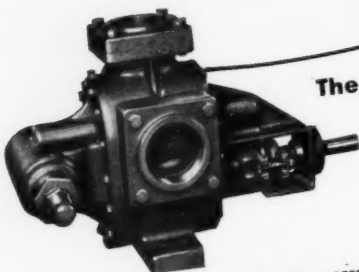
Sieve Size	Per Cent Passing			
	No. 1	No. 2	No. 5	No. 10
4-inch	100	.....	.....	.....
3½-inch	90-100	.....	.....	.....
3-inch	.....	100	.....	.....
2½-inch	25-60	90-100	.....	.....
2-inch	.....	35-70	.....	.....
1½-inch	.....	0-15	100	.....
1-inch	.....	.....	90-100	.....
¾-inch	.....	.....	40-75	100
½-inch	.....	.....	5-20	90-100
¾-inch	.....	.....	0-10	.....
No. 4	.....	.....	0-5	.....
No. 100	.....	.....	.....	5-30

Laid by Spreader

Concrete for the median strip, curb and gutter, and drainage structures was delivered to the job in the transit-mix trucks of Consumers Supply Co. out of Louisville. Base-course material came from the Louisville Crushed Stone Co., and was delivered by a fleet of trucks

(Continued on next page)

HOW A ROPER ROTARY PUMP HELPS ON ROAD CONSTRUCTION WORK...



**The Seaman TRAV-L-PLANT
Mixes, Applies Binder,
and Levels Road
Materials in a Single
Pass...**

The Seaman Trav-L-Plant is a versatile road building machine that mixes road building material, applies the binder, and leaves a smooth, level treatment which needs no further blading before compaction. The Roper Series 3600 plays its role in the mixing stage of the Trav-L-Plant, pumping the binder in an even, controlled flow for best results. As shown, the Roper is mounted on the front and is direct driven by a gasoline engine. Binding material comes from a transfer truck ahead of the Trav-L-Plant.

Such dependable design and construction features as helical gears running in axial hydraulic balance, high lead bronze bearings, split ring packings and split gland, and adjustable relief valve are reasons why Ropers are selected for rugged operation such as this. Get all the facts on Roper 3600 Series Pumps... in 7 capacities from 40 to 200 g.p.m.

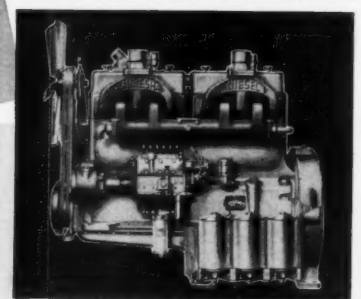
GEO. D. ROPER CORPORATION
226 BLACKHAWK PARK AVE., ROCKFORD, ILLINOIS

ROPER
Rotary Pumps

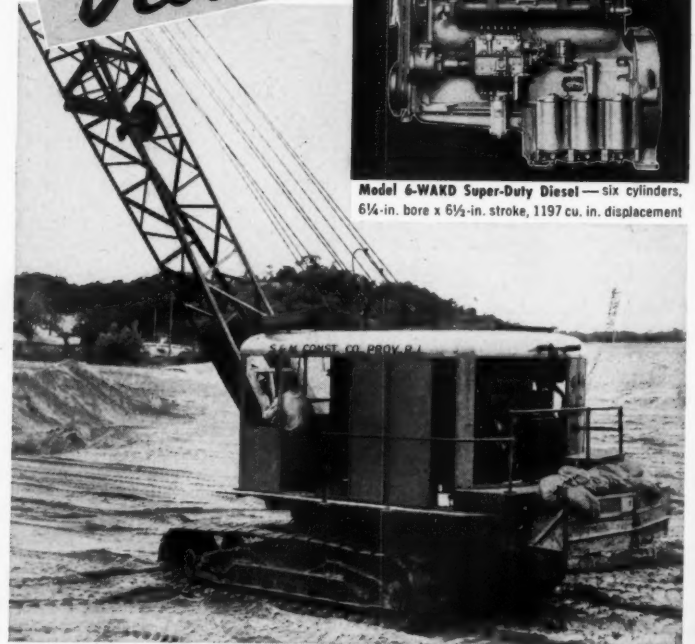
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Bulletin

WAUKESHA

Diesel



Model 6-WAKD Super-Duty Diesel—six cylinders, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement



...helps to extend CAPE COD HIGHWAY

This is the contractor's Diesel. A heavy-duty six-cylinder, four-stroke cycle, overhead valve engine—it has the power and puts it out smoothly and smartly—all the load demands, when the operator commands.

On this job—an extension of the Cape Cod Highway—a Waukesha 6-WAKD powered Lorain 820, with 65-ft. boom and 1¼ cu. yd. clamshell, moved 2000 cu. yds. of earth each and every 10-hr. day. And the Waukesha Super-Duty Diesel used 35 gal. of fuel per 10-hr. day.

High fuel economy is the result of that exclusive Diesel design feature—the patented combustion chamber which gives this Waukesha engine the ability to burn cleanly all modern high speed Diesel fuels of 45 cetane or above. That's the why of its lively acceleration, shock-free operation, low upkeep and long life. And, it's easy to start. For its many other advanced design and construction features, send for Bulletin 1415.

WAUKESHA MOTOR COMPANY
NEW YORK

• **WAUKESHA, WIS.**
TULSA
LOS ANGELES

after a 2-mile haul to the site. A Jaeger stone spreader laid the coarse material, while the screenings were put on with Tyler tailgate spreaders from the trucks and swept in by a power broom.

A pair of Mack 2,000-gallon tank trucks with spraybars at the rear supplied water for the base course. Rolling was done by two Buffalo-Springfield 10-ton 3-wheel rollers and a Galion 8-ton 3-wheel roller. The waterbound macadam was then primed with RT-2 tar applied at the rate of 0.25 gallon to the square yard; this work was done by the Highland Co. of Louisville.

Bituminous concrete for the 3-inch pavement came from the George M. Eady Co.'s asphalt plant located only 4 miles from the job. The plant is a Cummer 2,500-pound pugmill unit in which the aggregates were mixed dry for 15 seconds before the admission of the asphalt cement. Mixing with the bitumen continued for about 45 seconds more. A fleet of five trucks, each with a capacity of 10 tons, hauled the mix to the job site where it was laid by a Barber-Greene Finisher. Rolling was done by Galion 8-ton 3-wheel and Buffalo-Springfield 10-ton tandem rollers. A smaller Buffalo-Springfield 3 to 5-ton tandem roller was used around the curbs at intersections, and at cross-overs through the divisors. The mix was laid at an average temperature of 275 degrees F.

Two Courses

Crushed stone for the coarse aggregate in the plant-mix came from the Louisville Crushed Stone Co., while the sand for the fine aggregate was furnished by the Nugent Sand Co., also of Louisville. The Texas Co. supplied the PAC-5 asphalt cement which has a penetration of 85-100. The mix was laid in two courses—binder and surface—each 1½ inches thick and averaging 150 pounds to the square yard in weight.

The gradation of the mix for each course fell within the following limits:

Sieve Size	Per Cent Passing	
	Binder	Surface (Type A)
1-inch	100	.....
¾-inch	90-100	.....
½-inch	55-80	100
¾-inch	35-50	90-100
No. 4	25-35	50-65
No. 8	10-15	35-50
No. 16	5-10	20-40
No. 30	0-5	2-20
No. 60	0-5	0-10
No. 100	0-5	0-5
No. 200	4-7	4-8
Bitumen PAC-5		

In the binder course the bitumen



C. & E. M. Photo

A 10-foot-wide course of plant-mix is laid by a Barber-Greene Finisher along the concrete divisor strip of Kentucky Route 61.

averaged 5.5 per cent, and 6 per cent in the surface.

The 30-foot width of roadway on each side of the divisor consists of 28½ feet of blacktop pavement plus the 1½-foot abutting lip of the concrete curb. This affords an 8-foot parking strip adjoining the curb and two 11-foot traffic lanes on each of the dual roadways. The pavement pitches from the divisor to the curb at the rate of ¼ inch to the foot.

Measuring from the curb to the divisor strip, the plant mix for the binder course was laid in lanes of 10, 10, and 8½ feet respectively. For the surface course the material was put down in strips of 8½, 10 and 10 feet, also measured from curb to divisor. This system eliminated any overlapping of joints.

In the sequence of operations, the usual procedure was to lay the lane next to the curb first, and do the drive-ways and intersections at the same time. Then the lane next to the divisor was put down, followed by the one in

(Concluded on next page, col. 3)



CP ELECTRIC VIBRATORS SPEED THE HEAVIEST MASS CONCRETE PLACEMENT



This CP Bicycle Vibrator can be used anywhere within a 400-foot radius of the portable generator.



With their heavy-duty, low maintenance motors, CP Electric Vibrators have what it takes to handle harsh aggregates on big dam projects.

7 models of CP Vibrators

In the complete line of CP PNEUMATIC and ELECTRIC CONCRETE VIBRATORS the contractor will find a model exactly suited for any specific job.

There are one-man and two-man pneumatic and high frequency electric vibrators for mass concrete; one-man pneumatic and high frequency electric small diameter models for reinforced concrete walls and columns, and similar work.

Write for complete information.



**CHICAGO PNEUMATIC
TOOL COMPANY**

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

BLADES AND CUTTING EDGES of Superior Quality by Shunk

For all makes and types of road building and road maintaining machines. Also —

BULLDOZER BLADES
BUCKET LIPS
PATENTED
SCARIFIER and
ICE and SNOW
REMOVAL BLADES
MOLDBOARDS
SCARIFIER TEETH

All widths, lengths, and thicknesses; accurately punched to fit your make of machine.

Write for bulletins and other information.

Shunk

**MANUFACTURING
COMPANY**

Established 1854
BUCYRUS, OHIO

New Air Compressor

A 600-cfm portable air compressor is announced by Gardner-Denver Co., S. Front St., Quincy, Ill. It features a rugged undercarriage so it can be moved over rough terrain to location on construction projects. The engine is designed to provide reserve power at moderate operating speeds.

The compressor is an 8 and 6½ x 6;

operates at 1,200 rpm; and has large valve areas, large-radius air passages, and a carefully engineered ratio of low-pressure to high-pressure cylinders, the company says. The new 600 is a 2-stage machine, with water-cooled compressor cylinders.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 166.

CAMPBELL ALL-WEATHER DETACHABLE CAB

Special Features:

Protection for the operator in all kinds of weather — Maximum visibility — Quick installation. Complete operator comfort and roominess — Unobstructed entry to the operator's compartment.

Cabs of this design are available for most types and models of wheel and crawler tractors.

Illustrated literature with specifications is available.

Campbell Detachable Cab Co.
122 Kent Avenue, Wauconda, Illinois



Hough Model HM "Payload" with Campbell Detachable Cab.

Blacktop Pavement On Waterbound Base

(Continued from preceding page)

the middle. This routine applied to both binder and top courses. The binder course, together with any portions of the existing pavement used in the new work, were given a tack coat of PAC-5, applied at the rate of 0.1 to 0.15 gallon to the square yard before the surface course was laid.

Quantities and Personnel

Major items included in both the urban and rural sections of the contract totaled as follows:

Excavation	35,769 cu. yds.
Concrete sidewalk, 4-inch	8,509 sq. yds.
Box inlets	51
Manholes	34
Dividing strip	10,452 lin. ft.
Crushed limestone base	61,085 tons
RT-2 prime	24,095 gals.
PAC-5 tack	855 gals.
Curb and gutter	27,173 lin. ft.
Bituminous concrete, binder	9,145 tons
Bituminous concrete, surface	7,230 tons
Culvert sewer pipe, 12 to 42-inch	11,266 lin. ft.

George M. Eady Co. employed an average force of 60 on the project under the direction of W. E. Diuguid, Superintendent. Otis Henley was Project Manager.

For the Kentucky Department of Highways, Roy H. Hardy was Resident Engineer, assisted by W. T. Runner, Jr. The Louisville project was under the general supervision of District 3 of which W. H. Burton is District Engineer and W. P. Lane is Assistant in Charge of Construction. The Department is headed by D. H. Bray, State Highway Engineer, with C. B. Owens, Director of Construction.

New Flooring Cement

A flooring cement that is reported to set within a few hours and form a hard, dense, durable mass is manufactured by Flash-Stone Co., Inc., 3723 Pulaski Ave., Philadelphia 40, Pa. Magna-Crete combines magnesium chloride and magnesium oxide with certain fillers and fine aggregates. It is composed of carefully selected and balanced hard-rock fractures bedded in a matrix of mineral and vegetable fibers. It is supplied in dry form to be mixed on the job to a mortar consistency, then spread, leveled, and finished by troweling.

Features claimed by the company for Magna-Crete are light weight, good bonding qualities, resistance to oils and greases, hard surface, high structural strength, long life, and low maintenance cost.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 123.

Data on Fork-Lift Trucks

Three new bulletins on the FT Series of fork-lift trucks are issued by The Buda Co., Harvey, Ill. Bulletin 1579 describes the Models FT30-24 (gasoline-powered) and FTD30-24 (diesel-powered) which have a 3,000-pound capacity at a 24-inch load center.

Bulletin 1580 describes the Models FT40-18 and FTD40-18 trucks, which have a 4,000-pound capacity at an 18-inch load center. Bulletin 1581 covers Models FT40-24 and FTD40-24 which have a 4,000-pound capacity at a 24-inch load center. All three bulletins include illustrations, outline dimensions, specifications, and operating data.

This literature may be obtained from the company or by using the Request Card at page 16. For Bulletins 1579, 1580, or 1581, circle Nos. 179, 180, or 181 respectively.

Pioneer Advances Ellertson

O. J. Ellertson, Vice President of Pioneer Engineering Works, Minneapolis, Minn., manufacturer of aggregate-producing and asphalt-mixing plants, and paving machinery, has recently taken on added responsibilities. He has been placed in charge of all manufacturing and procurement operations of the company.

The export sales which Mr. Ellertson formerly handled now come under the Domestic Sales Department, headed by K. E. Brunsdale, First Vice President, and Carl R. Rolf, Vice President and Sales Manager.

HEAVY-DUTY TRENCHER

WITH NEW IMPROVED SELF CLEANING BUCKET — Capacity ½ yd.

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent. and is easily attached by one man in 15 minutes.

The Whitestown trencher is equipped with a ½-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for four years, and has proved to be rugged and satisfactory in every way.

• Immediate delivery can be made.



The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:

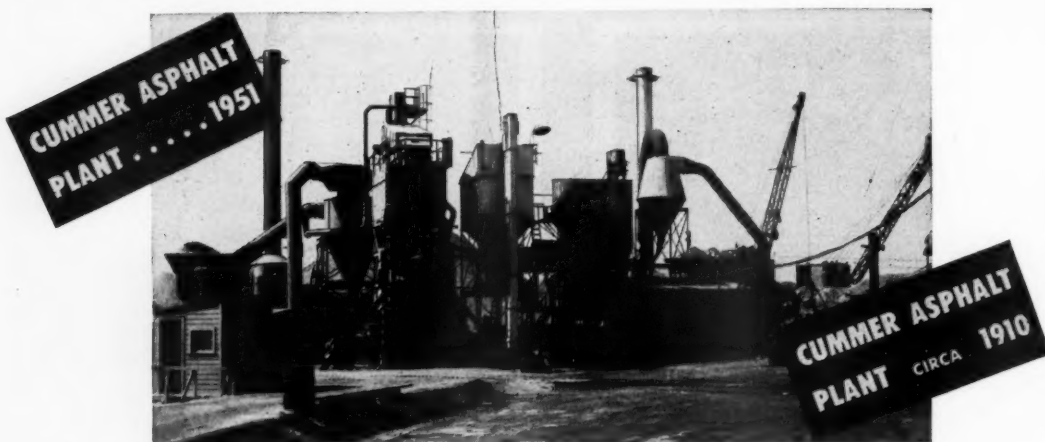
Allis-Chalmers HD-5G equipped with TS-5 tractor-shovel
Caterpillar D-4 and Tracton HT-4; Oliver with 4-A Lull loader
International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel
International TD-6, TD-9 & TD-14-A with Hough bulldozer-shovel
Hough Model HM-Payload; Trojan Loadster, Models LM-75; LC-100-B

• Please specify make of tractor.

WHITESTOWN TRENCHER CO., INC.

Wood Road, Whitesboro, New York

Phone: Utica 6-2430



"Twin plants . . . We call them Grandpa and Son . . ."

In such words does Harold Thompson of Cooke Contracting Co. describe their efficient, profit making twin plant set-up at Centerline, Michigan. Daily, these two Cummer Plants turn out peak production that more than meets the rigid state specifications. The new plant has a capacity of 1,000 tons a day.

The 40 year old Cummer Plant has a 500 tons per day capacity . . . one ton mixer . . . belt and sprocket driven . . . vibrating screen has been added. Notice common dust bin. This is positive proof that Cummer Asphalt Plants give you continuous, high, efficient production. Write for catalog.

THE F. D. CUMMER & SON COMPANY • CLEVELAND 14, OHIO

BUILDERS OF FINE ASPHALT PLANTS SINCE 1895

MOVING? Be sure to give us 30 days' notice of your change of address—and let us have your old as well as your new address.

Unless you do this you may skip an issue or two before the correction is made—and you won't want to be missing any issues of **CONTRACTORS & ENGINEERS MONTHLY** these days!

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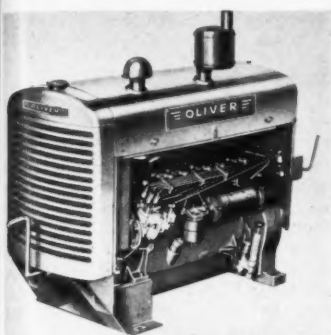
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EERS

6, N.Y.



The Oliver line of engines now includes the 6-cylinder 73-hp Series 199.

New 73-Hp Power Unit

A new and heavier series of power units developing 73 hp is announced by The Oliver Corp., 400 W. Madison St., Chicago 6, Ill. The Series 199 6-cylinder engines are available for gasoline and diesel fuels and are being developed for LP gas. They feature overhead valves and replaceable cylinder liners. Bore and stroke are 4-inch and displacement is 302 cubic inches. The engine has 1,800-rpm maximum continuous duty, with intermittent duty at 2,000 rpm, and a governed speed from 1,200 to 2,000 rpm, with close governor regulation.

Other features include interchangeable cylinder blocks, connecting rods, and pistons between diesel and carbureted models; interchangeable mounting dimensions between diesel and carbureted models; and a new Bosch single-plunger injection pump.

The power units may be used for electric generators, irrigation pumps, rock crushers, air compressors, industrial loaders, conveyors, sawmills, and as replacement units and standby power.

Further information on the Series 199 engines may be secured from the company. Or use the Request Card at page 16. Circle No. 176.

New Drum Up-Enders

A new hydraulic drum up-ender attachment permits a fork-truck operator to pick up, transport, stack, and empty heavy drums without leaving his seat. It can rotate drums 90 degrees for vertical or horizontal stacking, or tilt them 45 degrees below horizontal for emptying at any height within the lift range of the truck. Baker-Raulang Co., Industrial Truck Division, 1250 W. 80th St., Cleveland, Ohio, is the manufacturer.

The up-ender adds a rotating "fifth purpose" to Baker's 4-purpose carriage, which provides standard forks, fork-spacer, an automatic adjusting clamp, and side-shifter in one unit. The up-ender is demounted by removing two lock pins, unsnapping one hydraulic hose coupling, and sliding the up-ender off the forks.



With the Baker up-ender attachment a fork-truck operator need not leave his seat to handle drums.

Both the 4-purpose carriage and the hydraulic up-ender can be mounted on 2,000, 3,000 and 4,000-pound Baker fork trucks. The company points out that the up-ender safely handles any cylindrical objects up to 25½ inches in diameter on the 42-inch carriage and 31½ inches in diameter on the 48-inch carriage.

Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No. 124.

Bulk-Material Conveyors

A booklet of information on bulk-material conveyors and elevators has been published by Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. It contains photographs of the Bulk-Flo in a number of applications, together with typical layout drawings, engineering data, calculation tables, charts, and formulas. Over 150 materials are analyzed for average weight and such characteristics as size, flow, and abra-

siveness.

The Bulk-Flo serves as a self-feeding conveyor or conveyor-elevator in one fully enclosed assembly. It consists of an endless chain with spaced solid flights in a close-fitting enclosure, for moving free-flowing materials gently in a continuous mass, in horizontal, inclined, and vertical directions.

Pictures and diagrams illustrate the

Bulk-Flo's design flexibility. It is adaptable to many combinations of paths, including L-paths and vertical runarounds. Solid conveyor flights permit operation either fully or partially loaded. These flights move material in compartments, preventing avalanching on vertical or steeply inclined runs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 199.



BATTERY-OPERATED GREASEMASTER



- Attaches to any vehicle.
- 25 foot of high-pressure hose.
- Automatic switch controls any pressure setting up to 3,000 p.s.i.



★ Weighs less than 40 lbs. Can be carried anywhere.

G & T INDUSTRIES • 1440 BARWISSE • WICHITA 2, KANSAS

Driving's always smooth on the Rickenbacker Causeway

**FLEXCELL*
JOINT FILLER
keeps joints
smooth, tight,
maintenance-
free!**

Rickenbacker Causeway Between
Crandon Park and Miami, Fla.



Photograph by Richard B. Hoyt

JOINTS STAY CLOSED, neat, smooth when you use Flexcell Bituminous Fibre Expansion Joint Filler wherever concrete meets concrete. It's tough, durable, virtually eliminates maintenance!

MILLIONS OF TINY AIR CELLS in the cane fibre base of Flexcell permit it to absorb pressure from expanding concrete without extruding—spring back to keep the joint closed when concrete contracts. This prevents bulges and bumps, does away with gaping crevices.

LOW IN FIRST COST, Flexcell Joint Filler is easy to handle, easy to work with. Gives neat, finished joints without trimming. Protected by the patented Ferox® Process from dry rot and ter-

mite attack. Impregnated with asphalt to resist moisture. Withstands severest service and climatic conditions—saves on maintenance year after year!

THESE ARE THE REASONS why Flexcell has long been specified by leading engineers, contractors and architects, as well as the U. S. Army, Navy and many other Federal, State and Municipal agencies.

SO BEFORE YOU BEGIN another job, investigate the advantages and economies of using Flexcell Joint Filler—for pavements, runways, sidewalks, curbs, gutters, driveways, concrete floors. You'll be glad you did! Mail coupon today for full data.

MAIL COUPON TODAY

The Celotex Corporation, Dept. CEM- 62
120 S. LaSalle St., Chicago 3, Ill.

Without obligation, please send me complete data and prices on Flexcell Bituminous Fibre Expansion Joint Filler.

Name _____

Address _____

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Another **CELOTEX** Product
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FLEXCELL

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BITUMINOUS FIBRE EXPANSION JOINT FILLER

The Celotex Corporation, 120 S. LaSalle Street, Chicago 3, Illinois

*Flexcell is a Trademark identifying Bituminous Fibre Expansion Joint Filler marketed by The Celotex Corporation.

Road Men Swap Ideas At Purdue Road School

Representatives from Many Counties, Cities, and States Hear Research Papers and Discuss Mutual Problems

• **KEEPING** highway construction paced to an ever-increasing volume of traffic was the big problem discussed by 1,100 street and road officials this year at the 38th Annual Purdue Road School. Meeting April 14-17 at Purdue University, representatives from Indiana's cities, counties, and State Highway Department reviewed the latest highway research developments and took part in a healthy exchange of ideas.

The first day's sessions featured reports by road officials from neighboring states and by members of the Joint Highway Research Project. J. T. Sharpensteen of Genesee County, Mich., described how an efficient county road association can give expert advice on many phases of road-commission operations. He also showed how information on new methods and legislation can be distributed, how employees can be trained, and how strong state representation can be achieved through such an organization.

Durability of concrete was one of the considerations of the general session devoted to highway research. D. W. Lewis of the Joint Highway Research Project staff reported that heavy liquid separation of aggregates can be used in some cases to eliminate materials of low specific gravity. These low-porosity materials, he said, have poor resistance to freezing and thawing.

E. J. Yoder, also of the Joint Project, discussed the present status of stabilized-turf study. He reviewed a number of investigations which have been made to determine the best types of grasses and plants to establish, and the best nitrogen fertilizers to use.

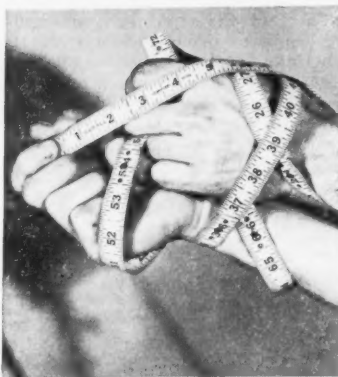
The major part of the remaining program was devoted to separate sessions for county road supervisors, county surveyors, county commissioners, city engineers, traffic engineers, street commissioners, and state highway maintenance, road-construction, and bridge-construction men. These sessions provided an excellent opportunity for those with comparable problems to meet informally and discuss them. Practically every man was called upon to make a report on his department's activities and to answer questions from his counterparts in other departments.

A general session of county road supervisors and commissioners was highlighted by a panel discussion on both technical and managerial problems. On the financial side, improved methods of accounting and purchasing were recommended. A Bureau of Public Roads official explained procedures for acquiring Federal-Aid money for secondary-road construction. The lack of some uniform set of county specifications on concrete and bituminous pavement was also criticized. In addition, it was felt that counties should be more careful when letting contracts and investigating performance bonds.

Road Show Too

The Highway Materials and Equipment Association held a 3-day road show in conjunction with the school. All types of road-building material and machinery from transits to Tournapulls were displayed in the massive Purdue Armory.

The Road School is one of the activities of the Adult Education Division of the University and is under the direct supervision of the School of Civil Engineering and Engineering Mechanics. Prof. Ben H. Petty supervised and directed the program.



Even when bent or twisted like this, the Durall 6-foot steel zigzag folding rule always returns to shape

Compact Folding Rule

A 6-foot zigzag folding rule made of a special hardened and tempered alloy steel is announced by Durall Tool Corp., 117 Woodworth Ave., Yonkers, N. Y. It weighs 3½ ounces and can be used to take inside measures; measure pipes, rounds, and pulleys; and as a straight-edge to draw lines on paper or boards. It also extends rigidly for out-of-reach measurements.

The rule can be opened up on the job and left open during work. Accidentally stepping on it will do no damage—it will not bend or break, Durall reports. The white enamel finish is specially bonded onto pretreated steel; it is baked at over 500 degrees and said to be extremely hard and adherent. The concave shape of the rule is designed to protect the

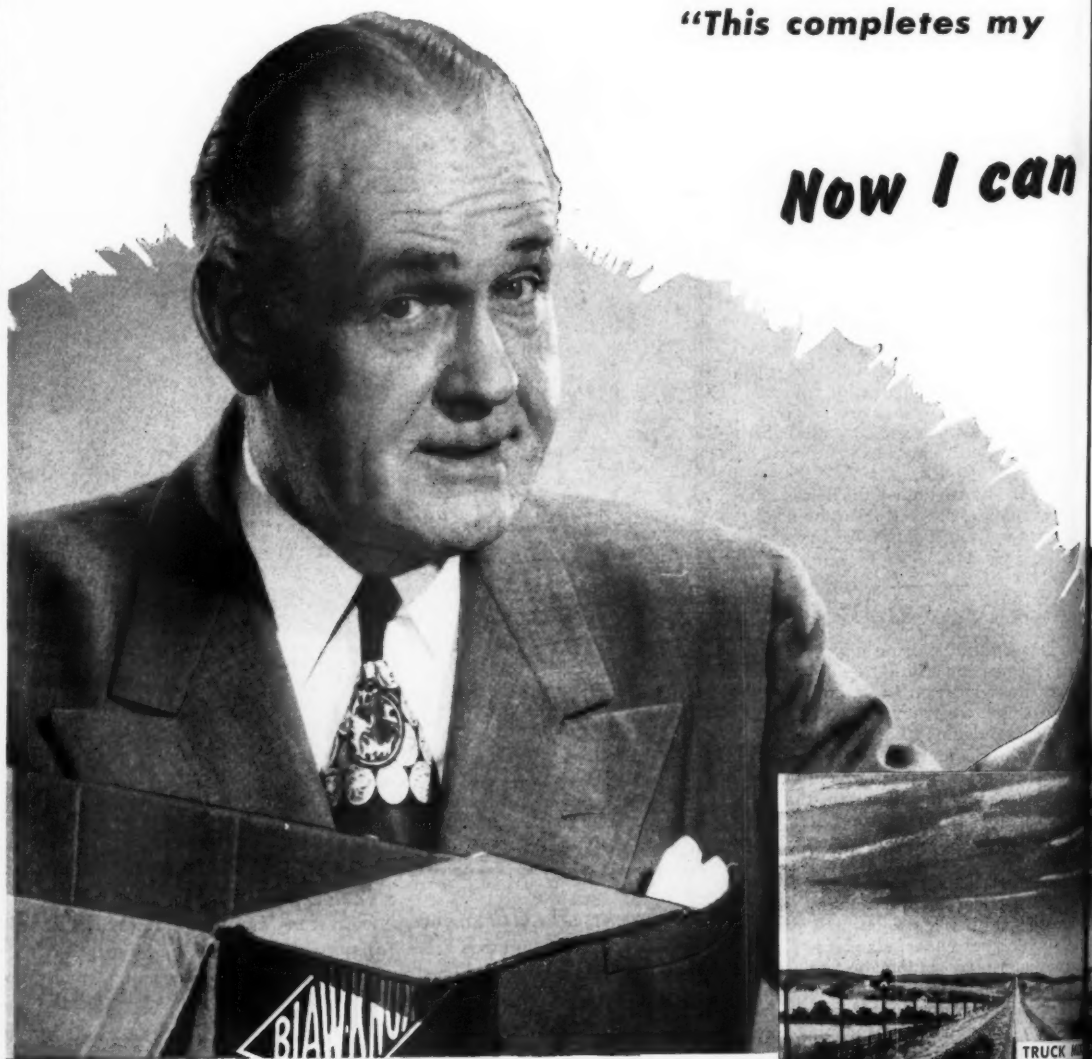
numbers and graduations from wear.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 146.

Brochure on Regulators

A 44-page booklet describing how regulators work on high-pressure tanks has been prepared by National Welding Equipment Co., 218 Fremont St., San Francisco 5, Calif. Cutaway views list all regulator parts and show their internal operation. Special attention is given to safety valves, adjustments, and cleaning. A table listing the specifications of both single and double-stage regulators is also included.

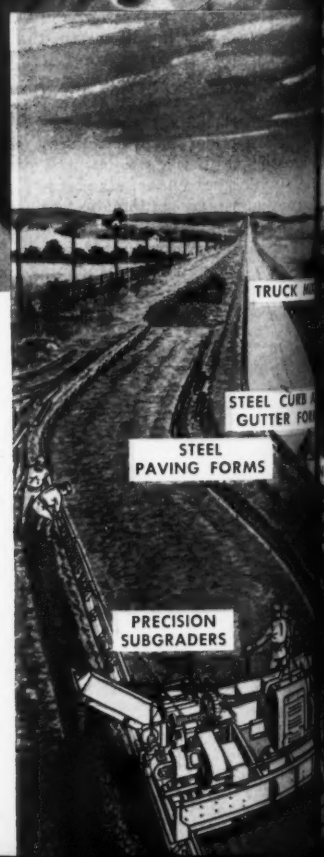
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 172.



"This completes my

Now I can ha

BLAW-KNOX Spreader-Vibrator and Finishing Machine working on Edens Expressway near Chicago. The vibrating pan on the Spreader assured proper densification throughout the slab, even though an exceptionally stiff mix of air-entrained concrete was specified. A finish tolerance of 1/8" in 10' was required. Other Blaw-Knox equipment in this "Complete Package" included Aggregate and Cement Batching Plants, Finishing Machines and Self-Aligning Steel Road Forms. MultiFoot Pavers placed the concrete.



Portable Plant Built For Armed Services

A plant which crushes and screens gravel and rock for use on air fields and military roads has been designed and manufactured for the U. S. Armed Services by the Pioneer Engineering Works, 1515 Central Ave., Minneapolis, Minn.

The Model 33R Triplex is a completely self-contained plant with a capacity of 50 tons per hour. Vital to its performance under military conditions is the fact that it can be placed in operating position, its conveyors readied, etc., merely with the use of hand tools and plant-mounted winches and hydraulic rams. Auxiliary cranes and jacks are not necessary, although they may be used if available. The



Pioneer's Triplex 33R crushing and screening plant, built especially for the Military, can be set up and readied to go without using auxiliary cranes and jacks.

plant is returned to traveling position with the same equipment, ready for the move to the next crushing and screening site.

BLAW-KNOX 'Package'...

can handle any concrete paving job!"

BLAW-KNOX PAVING SPREADERS

Like the other equipment in the "Complete Package", Blaw-Knox Paving Spreaders are designed for record-smashing production and high quality performance. By using the vibratory pan attachment on the Spreader, exceptionally uniform, dense concrete free from difficult finishing problems, can be obtained. This 20-25-ft. adjustable spreader, with the automatic transverse blade, can handle the maximum output of two 34-E paving mixers.

I'VE really increased the type of jobs I can handle by completing my Blaw-Knox "package" of concrete paving equipment, and so can you, to get ready for the big construction days ahead.

In the "Complete Package" you get *all* the equipment you need, from forms to finisher. You can use the entire set-up for the big jobs, or choose the units you need for whatever job comes up . . . roads, streets, airports, or even dams or bridges. And you can be sure of getting *all* the advantages of a "packaged" system . . . smooth, low-cost production-line operation, with each highly productive unit integrated with the others for big output at a steady, profitable pace.

You get a further profit pay-off in the *one-source* conveniences of a "Complete Package" . . . all your equipment from one responsible manufacturer vitally interested in your success, with only one financial contact, and backed by one construction-minded distributor organization working hand in glove with you to assure prompt, efficient service in parts and maintenance. One Blaw-Knox trained man can service *all* your "Complete Package" equipment! You can get the entire package on one order and in one shipment if you like, or choose the equipment you need *now*, then add the others as your needs increase.

Remember, when you have the Blaw-Knox "Complete Package", you can handle any concrete construction job faster, better and at the lower costs that assure profit.

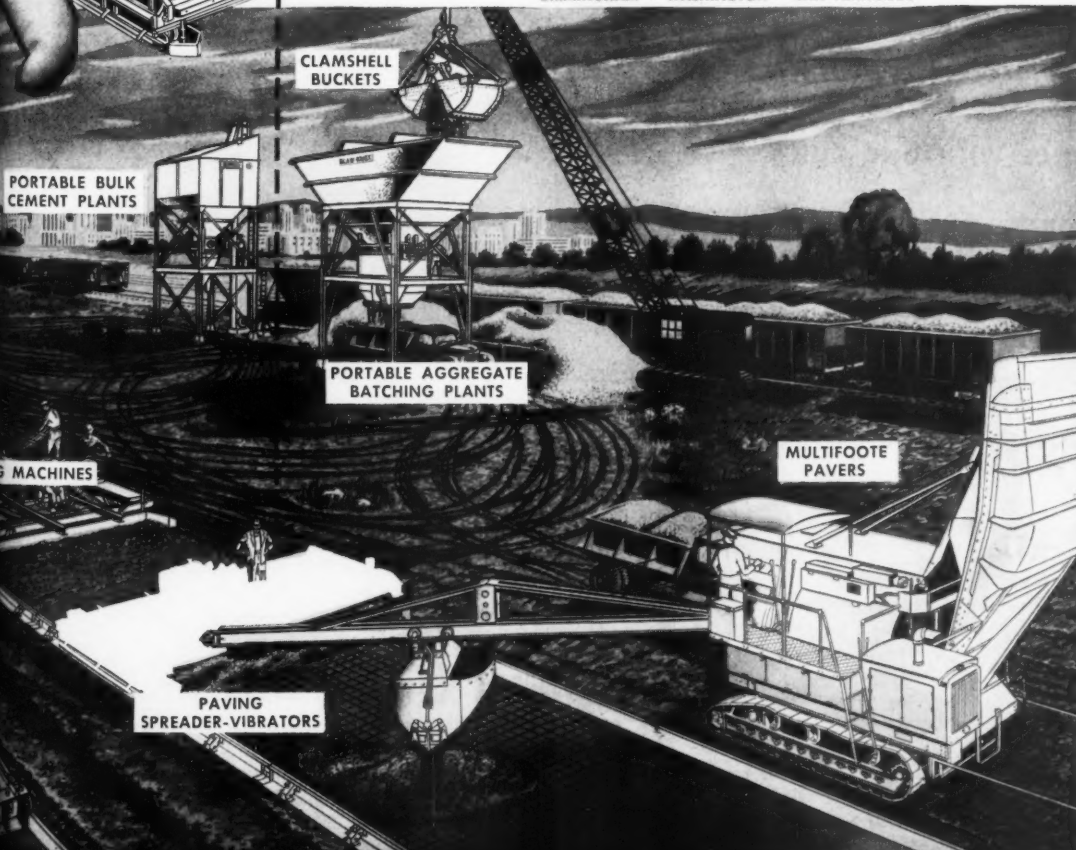
BLAW-KNOX

BLAW-KNOX DIVISION of Blaw-Knox Company

Farmers Bank Bldg. • Pittsburgh 22, Pa.

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BIRMINGHAM • WASHINGTON • SAN FRANCISCO



When It's Tricky, Call a Helicopter

Road building in tropical Cuba, whale spotting in the Antarctic, and seal spotting off the coast of Newfoundland—it's all the same to a helicopter. Not only can the helicopter hover for as long as needed over any given spot to be surveyed, but it is a handy little gadget for shuttling key personnel and important machinery parts from one end of a project to another.

New England Helicopter Service, Inc., Hills Grove, R. I., is much in demand for a variety of construction and other jobs, and up-to-date contractors have been quick to realize the advantages of the helicopter technique. Each machine assigned to a project is completely equipped with flying and maintenance crews, so that there will be no delay due to breakdowns. This is especially important in the unique jobs for which the helicopters are called in, involving the ability to land in an isolated spot where there is no airfield.

Compania General de Construcciones Publicas, a construction company in Santiago de Cuba, was faced with the job of building a road through the tropical wilderness from Santiago de Cuba on the southeastern coast of the island to Baracoa on the northeastern—a distance of 250 miles over territory that had never had a road of any kind. The company approached New England Helicopter Service, a machine was dispatched to the site, and results were immediately forthcoming. The difficult preliminary survey job was immensely eased by the fact that the helicopter made a steady operating platform for the photographers for as long as was necessary. After the survey work was over, the helicopter had another job to do: both ends of the road were begun simultaneously, and in order that they should meet at a point halfway, a close coordination of engineers and construction personnel was essential. This was achieved by running a helicopter shuttle service so the men could get from one part of the project to another with a minimum loss of time. As to the actual construction of the road, the helicopter kept busy flying in diesel fuel and parts for earth-moving machinery; and, when necessary, acting as a quick ambulance service.

This highly successful helicopter technique is becoming quite the thing in Latin America, where other plans for its use include such jobs as building catch basins; patrolling oil lines and high-power and natural-gas lines; passenger service; shuttling necessary parts to isolated mines; and transporting valuable minerals, including gold.

At the other end of the temperature chart, New England Helicopter Service reports that it has recently completed a job of spotting seals off the coast of Newfoundland and has now been approached by a company which wishes to spot whales in the Antarctic.





Eighty cubic feet is the capacity of this Yale & Towne (Philadelphia Division) truck hopper, which scoops up loads or can be loaded from overhead.

New Electric Truck Has End-Dump Hopper

A 4,000-pound capacity high-lift electric platform truck with an 80-cubic-foot end-dump hopper is available from The Yale & Towne Mfg. Co., Philadelphia Division, Roosevelt Ave. at Haldemann, Philadelphia 15, Pa. It is designed for handling bulky loads of loose

material such as sand, gravel, aggregate, metal chips, etc.

The hopper can be tilted downward to scoop up loads, or it can be loaded from overhead. The truck has a specially shortened platform to accommodate the hopper. The platform elevating mechanism is used to dump the hopper.

Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No. 131.

Bockmann Joins St. Paul

George J. Bockmann is District Manager, Southeast District, for St. Paul Hydraulic Hoist, Minneapolis, Minn., a division of Gar Wood Industries, Wayne, Mich. Mr. Bockmann will handle the St. Paul line of truck dump bodies and body hoists in the states of Alabama, Florida, Georgia, Kentucky, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia.

Only MASTER Provides Gas or Electric TURN-A-TROWEL Instant Change of Trowels



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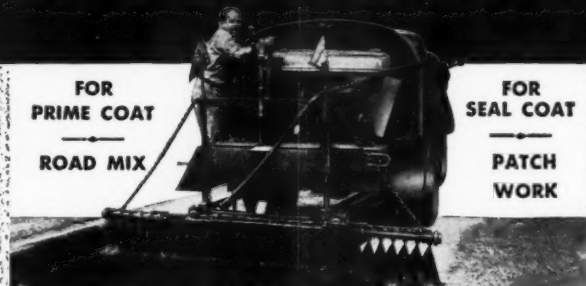
Line of Transit Mixers

An 8-page catalog on CMC transit mixers has been prepared by Construction Machinery Co., 447 Vinton St., Waterloo, Iowa. It describes the Transcrete right-angle drive, deep L-drum, and 3-way discharge system. The drum design features deep-section

blades and a progressively increasing blade slope. The enclosed hopper spout is said to eliminate flashback of cement and spillage of aggregate when charging. Complete specifications and a dimension drawing are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 188.

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Store Is Enlarged In Tight Quarters

Additions and Alterations to Alabama Department Store
Go Ahead in Spite of Steel-Shortage Delays

• ALABAMA is experiencing a construction boom that is felt from the cities along the Tennessee River in the north, to Mobile, seaport and second-largest city of the Cotton State, in the south. Commerce is keeping step with industry in this respect, and expansion in merchandising, for instance, involves the architect, the engineer, and the contractor. In downtown Mobile, as an example, the 73-year-old firm of C. J. Gayfer & Co., owner of the city's largest department store, is enlarging its facilities with the construction of a new modern building adjacent to its existing store.

Fred W. Clark is the architect and Ewin Engineering Corp., engineer and general contractor, is doing the construction. Both are from Mobile. The additions and alterations got under way in December, 1950, but the steel shortage seriously delayed progress. Despite the material shortage, the project is expected to be completed this month at an estimated cost of \$1,500,000.

Founded in 1879, Gayfer's has been at its present location since 1921. The existing four-story brick building has a 70.5-foot frontage on St. Emanuel Street, and extends 143.4 feet to the rear. Property acquired at the rear of the store provides space for an addition that extends from Conti Street to Dauphin Street, giving to the entire structure an irregular T-shaped outline. Instead of having entrance on only one street, the new store opens on three streets. One of the big advantages in the improvement is the 44.8-foot frontage on Dauphin Street, the "Main Street" of Mobile.

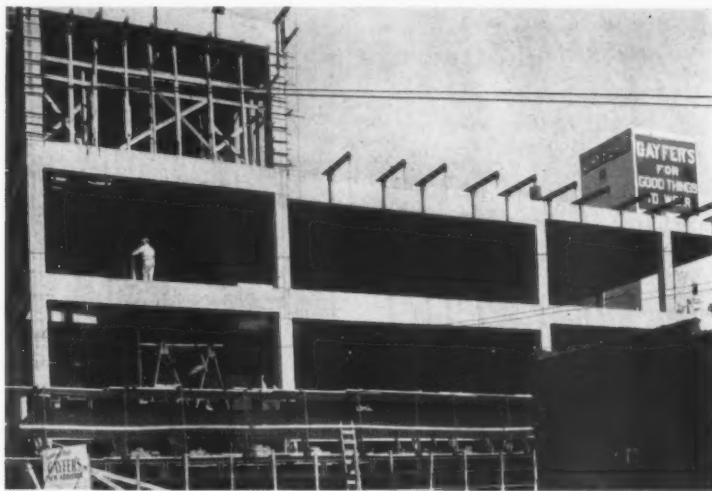
Big Increase in Floor Area

Significant figures in the construction are the 31,000 square feet of floor area in the existing building, and the 61,000 square feet in the new building, giving to the entire structure 92,000 square feet of space, or almost tripling its original capacity. Part of this increase was gained in the existing building when a 52 x 59-foot section at the rear was increased in height from one story to three stories to meet the height of the new building. While the new structure has three stories at present, it was so designed and built that the roof may

become a future fourth floor. A pent-house for machinery and air-conditioning equipment covers a small area above the roof of the new building.

In addition to the advantageous 44.8-foot frontage on Dauphin Street, the new portion has nearly a 100-foot frontage on Conti Street. Its length between the two streets is approximately 262 feet. The acquisition of the necessary property for this enlargement began as far back as 1943, as the store owners realized the need

(Continued on next page)



Ewin Engineering Corp. Photo

Brickwork for the store starts on the Conti Street side. Patent scaffolds, hung from beams on the roof, support the bricklayers' staging.



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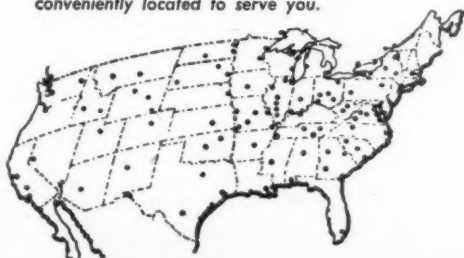
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Store Is Enlarged In Tight Quarters

(Continued from preceding page)

for expansion. Existing buildings were demolished, including a four-story store and office structure that provided the frontage on Dauphin Street.

Demolition of the latter posed some problems for the contractor, since the 9-inch brick bearing walls along each side were also party walls, and thus could not be removed. The brick, moreover, was soft, was held together with lime mortar, and was built up from a bed of sand. Heavy new footings were constructed to support not only the new building, but the party wall of the old building on each side.

Foundation

Nine combination footings, averaging 42 feet in length, form a foundation for this wing which is 135 feet long. They are spaced from 16 to 18½ feet apart on centers, and support the steel WF columns of the new structure. Constructed of heavily reinforced concrete, one of these typical combined footings has a depth of 5 feet and a bottom width of about the same measurement. Steel sheeting was driven to build the footings, the excavation was completed, and the hole was unwatered before the steel rods and concrete were placed.

Spread footings on treated-timber piles form the foundation for nearly all the rest of the structure. About 150 piles were required, 24 feet long with 8-inch tips and 12-inch butts. They were usually driven in clusters of three, and were left with 3 inches of their length embedded in the concrete footing. Where the ground had sufficient bearing capacity, no piles were required. Subsoil at the site consisted of sand, clay, gumbo, and a stratum of decomposed vegetation. A Koehring ¾-yard rig was the key machine in the excavation and pile driving for both timber foundation and sheeting.

Excavation totaled about 2,000 cubic yards, and about half of this, mostly undesirable material, was hauled away by trucks and wasted. The remaining better grade was stockpiled for use as backfill. Piles were driven with a Vulcan No. 2 hammer, powered by a large Jaeger air compressor. To safeguard the stability of the walls of several of the adjoining buildings during the construction, rows of steel sheeting were driven in parallel rows. For this purpose 12-foot lengths were sufficient, and they were driven with a Thor air hammer powered by a Le Roi 105-cfm compressor.

Concrete Work

Only part of the building has a basement, most of the first floor being just above ground level. The deeper basement portion and the power vault are enclosed within steel sheet piling 30 feet long. Wellpoints were used to dewater the ground for the construction of this section which has an area of about 1,300 square feet. It is chiefly supported on timber piles. Outside the cofferdam, the spread footings to support the steel columns are on various levels according to the imposed loads and the bearing capacity of the soil.

Footings are either square or rectangular in shape, and vary in size, the smallest having a 6 x 6 x 1½-foot base. Both the footings and the 12-inch foundation walls are of reinforced concrete, and were poured in wooden forms built on the job site. Mall portable saws with 6-inch blades speeded the hand work in form building. For the walls ¾-inch lumber was used, while 2-inch sheathing was put in the heavier footings. Richmond ties held the panels together.

Reinforcing steel, totaling some 80 tons, was supplied by Ceco Products



Ewin Engineering Corp. Photo

At the second-floor level of Gayfer's store in Mobile, Ceco steel joists are welded to the horizontal members of the structural framework to support the floor slab.

Co. of Birmingham, Ala., while transit-mix concrete for the entire job came from the Radcliff Gravel Co., Inc., of Mobile, which has a plant within a 10-minute drive from the site. From two

to four units—Jaeger 4½-yard mixers on International trucks—were sufficient to handle the project needs. Total amount of concrete required was approximately 2,500 cubic yards.

3,000-Pound Strength

The Class A concrete, designed for 3,000-psi strength at 28 days, contained a maximum 1¼-inch aggregate and both portland and slag cements, proportioned 3:1 respectively. For the foundation and slab pours the concrete was chuted directly from the truck mixers into the forms. The basement rough slab at elevation 4.1 is 7½ inches thick. With a finished elevation of 15.48, the first floor consists of a 4-inch slab laid on earth, and topped by a 2½-inch finished course. The lower course is reinforced with 6 x 6-inch welded wire mesh.

Foundations were completed by May 1, 1951, but because of the delay in material the erection of the steel framework did not begin until the middle of June. The structural item amounted to 500 tons, with the fabrication and erection handled by the Mobile Steel Co. Column shapes varied in size, the maximum being a 12-inch WF 133-pound section. Erec-

(Concluded on next page)

Now... DESIGN SIMPLICITY



tion to the third-floor level was done from the ground with a crane. Then a derrick was assembled on the third-story framing for erecting steel in the penthouse at a higher level.

Ceco standard steel joists, totaling 110 tons of material, were welded to the horizontal members of the framework at 20-inch intervals. Steeltex floor lath was then stretched between the joists, pulled taut, and firmly anchored so as to serve as a form for the concrete floor slab. The Steeltex consists of 3 x 4-inch mesh backed with reinforced kraft paper. The 2½-inch concrete slabs are also reinforced with ¾-inch rods on 12-inch centers both ways.

Interior and Exterior Features

All interior cement-finished floors, after being cured with water, were given three coats of Lapidolith, a liquid hardener. The roof slabs, also 2½ inches thick, were poured with Zonolite, a lightweight concrete which was also used in a fireproof encasement

of the steel superstructure. The roof slab was topped with 2 inches of insulation, over which was laid a cover of 20-year bonded material. The first or ground-floor slab has a finished surface of terrazzo, while the concrete in the floors above are covered with carpet. A tower on the outside of the building was used to hoist the concrete and other materials to the desired floor level.

Entrances on Dauphin and Conti Streets are flanked by show windows bordered with Granux, a precast granite stone. Marquees with metal fascias overhang the walks on both of these sides. Above the marquee on the Dauphin Street side is a windowless front of Roman travertine. The Conti Street elevation is of gray brick trimmed with the travertine. Other walls, 13 inches thick, are of common brick.

Inside are the conventional hung ceilings, plastered walls, modern lighting, etc. The building is completely air-conditioned with a York system. Otis two-way escalators serve the sell-



C. & E. M. Photo

A Thor air hammer powered by a LeRoi 105-cfm compressor drives a 12-foot length of steel sheeting to protect the walls of a building adjoining the department-store site.

ing floors, and there are also a freight elevator and staircases. The general contract included all plumbing, heating, air conditioning, sprinkler system, and electrical work.

Personnel

Ewin Engineering Corp., the general contractor, employed an average force of between 60 and 75 men on the building construction, at first under the direction of Ross H. Boas, General Superintendent, with George V. Mahoney, Assistant Superintendent, and later under Nolan H. West, General Superintendent, with Berrey O. Morgan as Assistant Superintendent.

Frew W. Clark, Mobile, is Architect; Robert G. Lose, Atlanta, is Structural and Architectural Engineer on the design features; Newcomb & Boyd, Atlanta, is Mechanical and Electrical Engineer; and Carson & Lundin, New York, is Consulting Architect.

Modular Folding Rule

A 6-foot aluminum folding rule for laying out modular brick is made by Woodmark Industries, 4601 Highway 7, St. Louis Park, Minneapolis 16, Minn. One side of the Modulrule has the usual markings, to the sixteenth of an inch, with each inch and foot numbered. The other side is a 16-inch repeating series of numbers that shows the vertical coursing for 5 different heights of modular masonry units.

A given-size modular brick is always laid the same number of courses in 16 inches with a specified joint thickness. The rule has a scale for 3 brick and 2 tile sizes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 165.

He Kept It Under His Hat

Congratulations are in order for Bennie Mellesmoen, Senior Journeyman in the Maintenance & Construction Department of Minnesota Power & Light Co., because he had the foresight to save his own life. It was simple: he wore a protective hat while doing routine work on the new Blanchard Dam, south of Little Falls, Minn.

A heavy reinforcing rod struck his head while he was standing on a scaffold beneath a concrete pier. It pierced his Skullgard, but his head received nothing worse than a cut. Mr. Mellesmoen would have been killed or would at least have suffered serious injury, according to company officials, if the ¾-inch 7-pound rod had fallen on his unprotected head. Instead, three stitches to close his scalp wound, and he was back on the job without lost time.

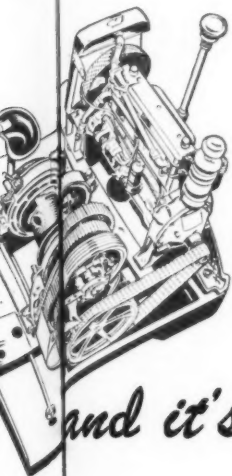
Specifications on Trucks

Specifications on the full 1952 line of Ford trucks are presented in a 4-page bulletin. The folder gives complete tire, axle, brake, transmission, steering, spring, and wheel information on all models from the 4,700-pound F1 to the 22,000-pound F8.

This literature may be obtained from the Ford Division of Ford Motor Co., Dearborn, Mich. Or use the Request Card at page 16. Circle No. 247.

Slottman Is Airco V. P.

Dr. George V. Slottman was recently elected a vice president of Air Reduction Co., Inc., New York, N. Y. He has been the company's Director of Research and Engineering since 1949, and will continue in charge of that activity. Dr. Slottman joined Airco in 1934 and has been closely associated with the company's development and introduction of steel-making processes using oxygen for both combustion purposes and as a chemical reagent. He has written a number of articles on these topics.



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A line of 15-ton-capacity dump trucks with a new planetary-type drive axle are in production for the U. S. Air Force at the Sterling Division plant of The White Motor Co., 2021 S. 54th St., Milwaukee 1, Wis. The rear axle, with the Sterling-White-Plan-a-Power Super-Traction differential, divides the power delivered to each rear wheel according to the amount of traction existing between the tire and the road surface; thus the greater portion of the pulling power is delivered to the wheel having the best grip, to prevent the spinning of one wheel and the possible stalling of the vehicle on wet, muddy, or slippery roads.

The chassis is powered by a 250-hp engine and the transmission is of the ten-speed type. Front-wheel tires are 13.00 x 24 18-ply lug tread, and rear tires are 16.00 x 25 24-ply lug-tread duals. Hydraulic power-actuated steering gear is said to give good maneuver-

ability and ease of operation. The rock-type body has a water-level capacity of 10 cubic yards. The hoist is of the hydraulic dual telescopic type with a high dumping angle to permit clean and rapid discharge of the load.

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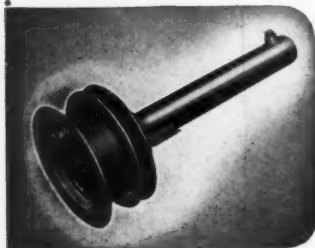


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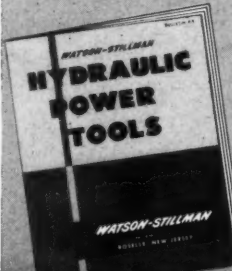
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CONTRACTORS & ENGINEERS MONTHLY
470 Fourth Avenue
New York 16, N.Y.

Aluminum Use Soars In Construction Jobs

Within five years an estimated three billion pounds of aluminum per year will be going into construction if the present trend continues, according to Reynolds Metals Co., Louisville, Ky. Construction is already aluminum's largest single customer, and it's not hard to see why, says the company. The supply of lumber is getting shorter, and it's the same with steel, while the prices of steel, copper, and zinc are climbing to new levels as against aluminum's low steady price. Added to this, aluminum has better corrosion resistance than steel; extruded sections and special finishes on aluminum make it easy to obtain ornamental effects; it has better heat reflectivity; it is economical in foundation and erection costs, especially with wall-curtain construction; and fire underwriters favor aluminum over wood. Reynolds has broken down into eight general classifications aluminum's various building and construction uses, in their present order of importance, though, the company adds, this relationship may very well change in the near future. The breakdown follows:

1. Roofing and siding: 200,000,000 pounds of aluminum go into this yearly, which is about 40 per cent of the total quantity of the metal used in building and construction.

2. Windows and accessories: During 1950 various types of windows, as well as window frames, awnings, shutters, and ventilators, accounted for about 85,000,000 pounds, or nearly 20 per cent of the total. A tremendous potential is foreseeable here, because only some 12 per cent of all types of windows are at present made from aluminum.

3. General construction products, such as builders' hardware, duct work, fire escapes, lighting fixtures, and other strictly utilitarian building fixtures: Current rate of consumption, 48,000,000 pounds a year—about 10 per cent of the total amount of aluminum used. Keep your eye on aluminum fire escapes, the company advises.

4. Ornamental products, including chalk troughs and blackboard moldings, elevators and moving stairways, grill-work, handrails, marquees, spandrels, and ornamental fixtures: About 30,000,000 pounds went into these during the past year, and Reynolds expects it to increase to 47,000,000 within the next two years.

5. Prefabricated buildings, such as storage bins, utility buildings, garages, aircraft hangars, residential housing: Total consumption during 1951 was 21,500,000 pounds. While possibilities here are good, no one has yet produced a successful aluminum prefabricated house. If that should happen, the figures in this category will soar.

6. Walls, partitions, ceilings: This market can easily become one of the first three within a few years. Present aluminum consumption in this category is 15,000,000 pounds a year, but it could well rise to 60,000,000, making this the greatest single new aluminum outlet. The reason lies in the present interest in curtain-wall construction, which involves hanging the exterior walls of a building on the structural framework. Thinner aluminum walls would result in building lightness, which means a material saving in structural-steel costs and more usable office space.

7. Doors and store fronts: 10,000,000 pounds a year, with a potential of 25,000,000 by 1953. Modern design demands a "white metal" and aluminum is the best all-purpose metal on the market, Reynolds says.

8. Highway structures: Bridges, bridge railings and floorings, as well as highway guardrails and light poles, while at the moment small users of aluminum, may use 5,000,000 pounds a year by 1953. A bascule bridge in England and a highway bridge in Canada

are examples of use in bridges.

Another interesting use of this metal, Reynolds points out, is in remodeling work. In remodeling its own general sales office at 2500 S. Third St., Louisville, the company tried out aluminum "drop" ceilings on a large scale. The new ceiling is suspended several feet below the old to allow a space for air-conditioning ducts and wiring. Acoustic material is glued to the true ceiling above the suspended one, and perforations in the suspended aluminum panels allow sound to travel through and be absorbed by the acoustical material above. The perforations also obtain uniform distribution of air from duct outlets above the suspended panels down through them to the working areas.

Reynolds cites other instances where aluminum has been used for remodeling, as well as for general construction purposes, both at home and abroad. The potentialities of this lightweight metal are enormous, the company says, and great things may be expected of it within the next few years.

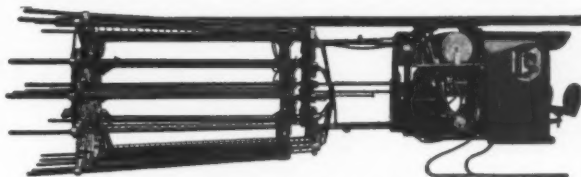
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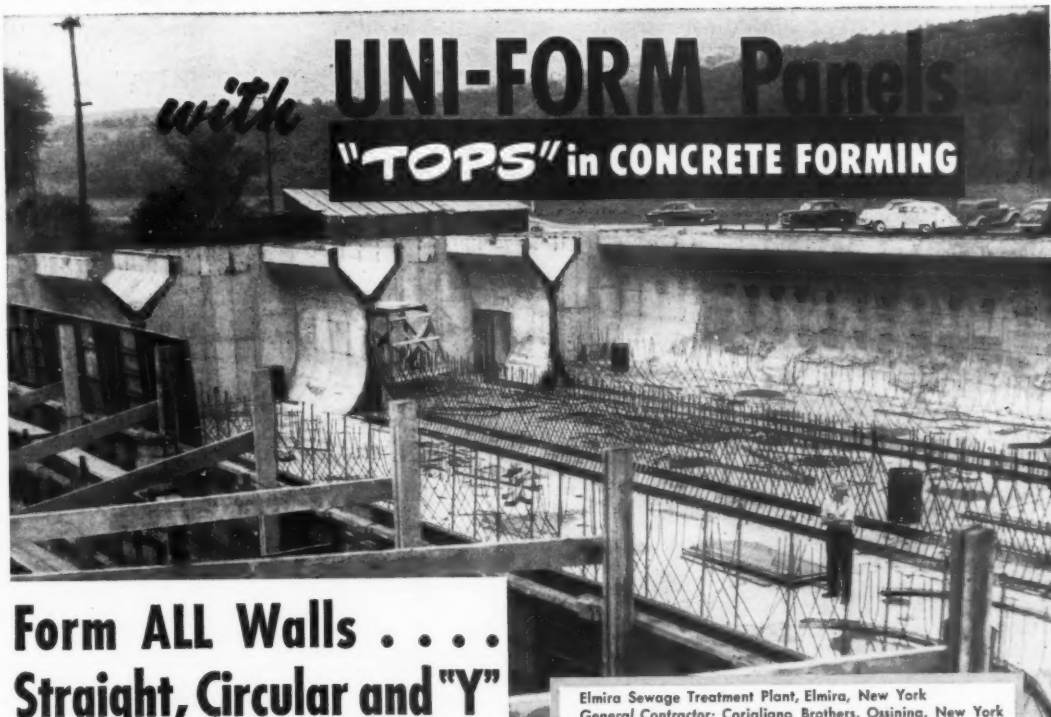
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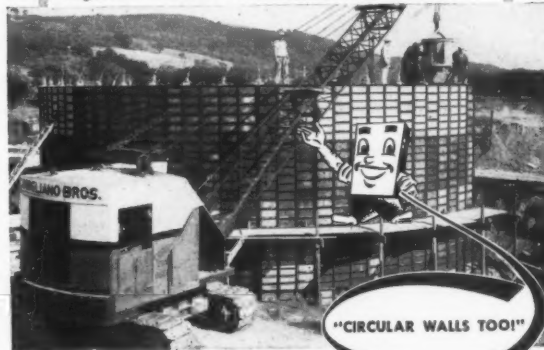
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The Phoenixspan Sturdilite heavy-duty flood lamp is now available as a portable unit, weighing 12 pounds.

A New Flood Lamp

The Phoenixspan Sturdilite heavy-duty flood lamp is now available as a portable unit, reports the Metal Spinning Division of Phoenix Products Co., 4715 N. 27th St., Milwaukee 16, Wis. Equipped with carrying handle and a pedestal base, the 12-pound Sturdilite is especially adapted for use around construction projects, the company says.

Similar in general style and specifications to the standard shock-absorbing-base model designed for equipment mounting, the flood lamp is available for all voltages, with the standard model designed for 110-120 volts, in 150, 300, and 500-watt sealed-beam lamps. It is said to supply a high degree of light intensity and ample beam spread, and there is no reflector to tarnish or lens to break, as the reflector is in the light bulb. The light socket is spring-mounted, and the unit comes equipped with a 4-foot cord and connector.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 134.

A Portable Furnace

An improved type of portable furnace which furnishes heat in winter and circulates cool air in summer is announced by Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich. Model PW-189 delivers 189,000 Btu of heat per hour—49,000 Btu more than previous models. As in other Fageol machines, heat is sprayed out at the floor level over an area of approximately 3,000 square feet. This heat is reported to be concentrated in a work

zone from the floor to about 6 feet above it.

The furnace converts to a cool-air blower in summer by changing the top blower mounting. The machine delivers 1,500 cfm of cool air.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 173.

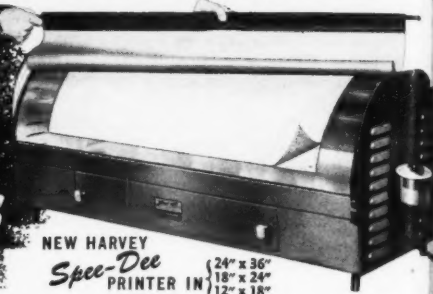
Scraper for Small Tractors

A 5½-foot-wide scraper that is attached behind Ford or Ferguson tractors is the subject of a bulletin issued by The Tractor Sales Corp., 1409 Santa Fe Ave., Los Angeles 21, Calif. The McGee is controlled hydraulically and can be used for scraping, backfilling, scarifying, and grading. It has 6 scarifying teeth in front of a ¾-yard bucket. The oval enlargement of the arm slot permits rocking action of the blades and increases flexibility.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 187.

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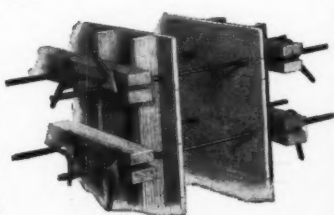


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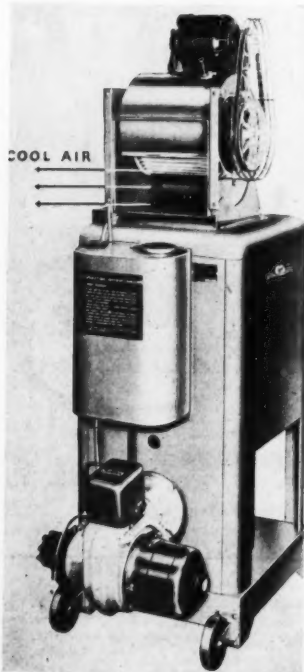
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The Fageol PW-189 portable furnace—it can be converted to a cool-air blower in summer.

Lab Keeps Close Tab On County Road Work

Strict Control of Materials, Design, Fabrication, and Placing
Assures Top-Notch Pavements for New Jersey County

By ALBERT C. SMITH

• "WHEN pavement goes down in this county we know what's in it and we know why", Curtis C. Colwell, Essex County Engineer, says. And there are some top-notch roadways in this New Jersey county to prove his statement.

With a permanent staff of nine men, the County Testing Laboratory not only designs all pavements, but checks construction from the sieve stage right through to the day the barricades are opened. The same men analyze the samples from the aggregate bank, design the mix, check the batches, and inspect the placing. On the first day of a new project, the batch is tested, adjusted, and accepted usually before one hour has passed. The lab men can rightfully boast, "We know what's in it and we know why."

Modern Spex

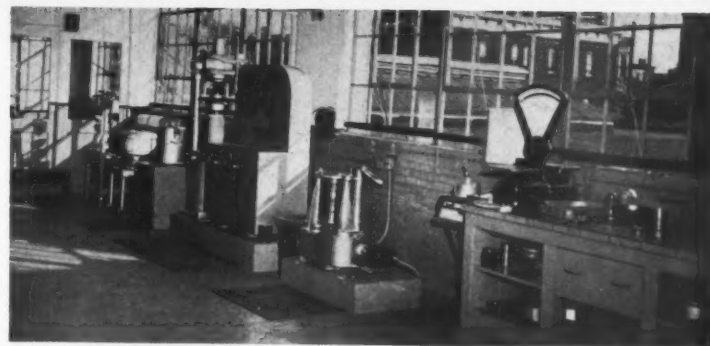
But there are other reasons why they can boast. Working with Leslie Long of the Newark Testing Laboratory, Richard Booth, the County's Testing Engineer, and his assistant, Ellis Vieser, drew up a complete and modern set of bituminous and cement-concrete specifications. Other states, consultants, national groups, and testing agencies, as well as local experience, all contributed information. The work was completed only recently and over 200 requests for the spex have already been received from individuals and groups. In fact, a number of agencies have adopted them as standards.

The specifications, like the entire lab setup, do as much as possible to orient all concerned parties. As Vieser pointed out, "If the producer knows our problem, if the field man knows what the lab man does, and if everyone has something written down that tells him why, we all do a better job."

Instead of getting a slip of paper marked merely 1:2:4 mix, the Essex County concrete producer gets a de-

sign which tells him pretty well everything he ought to know about his materials and how they should be put together. If he is interested in the actual design computations, he can consult a special section in the specification in which a complete design problem is worked out. Few public specifications actually take the basic information on the fine and coarse aggregate and give the step-by-step design details right through to the final weights.

A complete set of nomographic charts gives the water-cement ratio



C. & E. M. Photo

The up-to-date staff-built Essex County, N. J., Testing Laboratory. The office is on the extreme left. Machines are, left to right: Biehle briquette machine, International centrifuge, Dulin Rotarex, Tinius Olsen compression machine, apparatus for grading aggregate, scale and Hubbard-Field test equipment.

for various aggregate sizes and desired compressive strengths.

Bituminous Spex

The more recently developed bitu-

minous-concrete spex are again a good example of the way the lab staff has attempted to simplify and standardize. Unlike concrete, Booth explains, asphalt (Continued on next page)



AMSCO dippers keep the heat on loading at 50° below zero

North Pole weather plus loading "pure rock" are no problems to Manganese steel dippers.

In June, 1948, an iron mine in the northwestern Adirondacks installed its first AMSCO dipper. It's still going strong—16 hours a day, 7 days a week! Old type dippers used previously lasted as little as one week. And the mining company had to employ four welders full time to keep them going.

In design, too, AMSCO dippers are made for the type of punishment low grade ore and low temperatures inflict. Except for tooth work, the only repair has been the replacement of the heel band after two-and-a-half years of this kind of vigorous operation.

Of course, not all mining and excavating operations are as tough as this one . . . but it's

a good example of how to save money and manpower through the use of AMSCO products.

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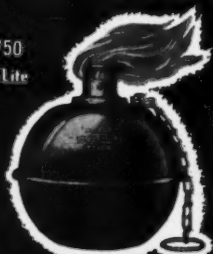


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Lab Keeps Close Tab On County Road Work

(Continued from preceding page)

had always been a complicated affair from the lab standpoint. Because states and various national organizations have each adopted different sys-

tems of terms, it is difficult to specify what is wanted. In addition, many engineers and inspectors have been confused about the ingredients in an asphalt pavement and how they are put together.

Working again with Leslie Long, the Essex County lab men cleared up the problem with a graphical picture and a

number of charts. The picture shows 9 rectangular blocks each representing a type of pavement. The block on the extreme left shows only fine aggregate, indicating sheet asphalt; the one on the extreme right shows all coarse aggregate. The increase in coarse aggregate and decrease in fine aggregate from left to right represents the gradual change to bituminous concrete, then amiesite, and finally all aggregate. This system gives the designer 7 groups of bituminous pavement to pick from. Each group is charted to give the per cent bitumen for the desired sizes of coarse and fine aggregate. In this way, a simple standard is set for quick checking by both inspector and producer.

Staff-Built Lab

The lab itself is a tribute to the conscientious men who maintain its order and cleanliness. Only a year ago it was blank space next to a county warehouse. Today it consists of a glass-partitioned office, a fully equipped labo-

ratory, a moist room for curing concrete cylinders, and a workshop and receiving room.

At practically no cost to the County except for materials, the staff built a 1,100-square-foot concrete-block structure. The entire program of building, moving from the old headquarters, installing, and painting was done by lab personnel during the winter of 1951. Even the desks, chairs, and file cabinets were acquired by the staff. By the beginning of the construction season in March, they had a functional lab all set to operate.

The staff consists of the Testing Engineer, his assistant, 2 lab technicians or plant men, and 5 permanent field inspectors. The Testing Engineer is in charge of all outside construction in Essex County. His assistant runs the lab and designs the mixes. The lab technicians conduct the standard tests and also work at the batch plants. Field inspectors are usually assigned to specific projects until completed.

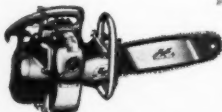
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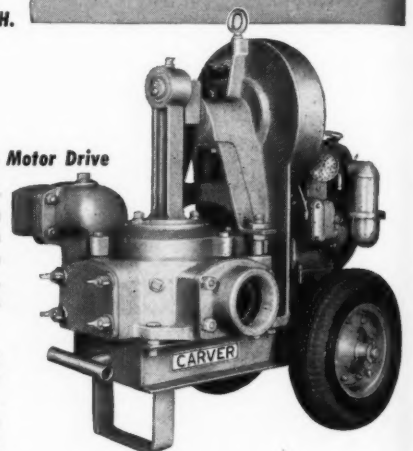
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Every man is trained to know as much as possible about the over-all aspects of his job, in addition to the technicalities of construction. During the winter the Testing Engineer and his assistant conduct classes in design, laboratory technique, interpretation of specifications, mathematics, and even public relations. To give all members of both the permanent and temporary staff a better idea of the inspector's place in the construction project, a 6-page booklet entitled "Instructions to Inspectors" is issued. In a very clear and personal style it explains the inspector's general duties, hours of work, reports, and public-relations responsibilities. As a public servant he is reminded to be consistent, accurate, honest, fair, and courteous.

Concrete Inspection

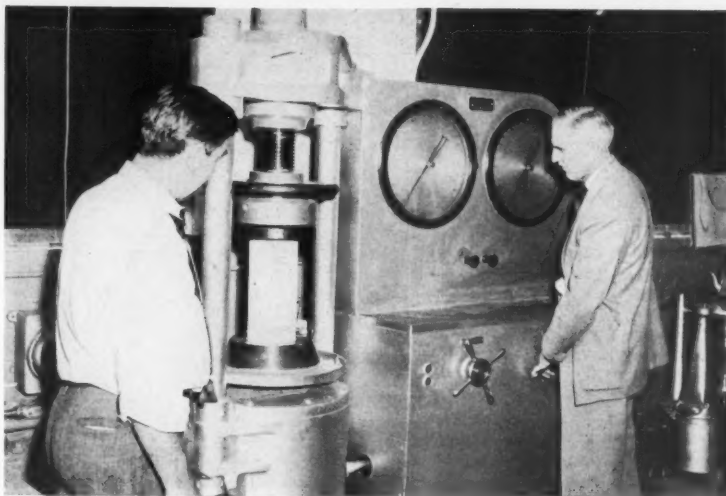
Concrete inspection begins at the aggregate bank or stockpile of one of the 9 plants that serve the County. Periodically, samples from every source of raw material are analyzed so that a mix can be designed for each supplier. All standard AASHTO tests are made of cement and fine and coarse aggregates.

Each plant reports to the lab when an order for county concrete is placed. With this arrangement, the lab men are able to keep ahead of all concrete pours.

At the batching plant, the inspector continually checks the scales against the design of the mix. In addition, he keeps tabs on the moisture content of the fine aggregate. He does this simply and rapidly, using only two buckets, a scale, and a calibrated rod. A table of curves, based on calculations using Archimedes' principle, gives the increase in sand and decrease in water that must be made to keep the same mix design.

In the field, the Assistant Testing Engineer takes samples every 100 yards of pour per class of concrete at each location. He also makes standard slump and air-content tests.

The 6x12-inch test cylinders are set in a box at the job site for one day. Back at the lab they are capped at each end with a mixture of plaster of paris and hydrostone. After this they are placed in racks in the moist curing room where the temperature is kept at 72 degrees F and the humidity as close to 100 per cent as possible. At 7 and 28 days specimens are tested



C. & E. M. Photo

Richard Booth (right), Testing Engineer, works the controls of the 300,000-pound Tinius Olsen compression machine in the county laboratory, while Harold Lyons keeps an eye on the concrete cylinder.

on the 300,000-pound Tinius Olsen compression machine.

Standard cement and sand tests are made on a Riehle tension machine. Briquettes of cement and Ottawa sand are pulled apart to test the tensile strength. A pat test for soundness of cement is also made.

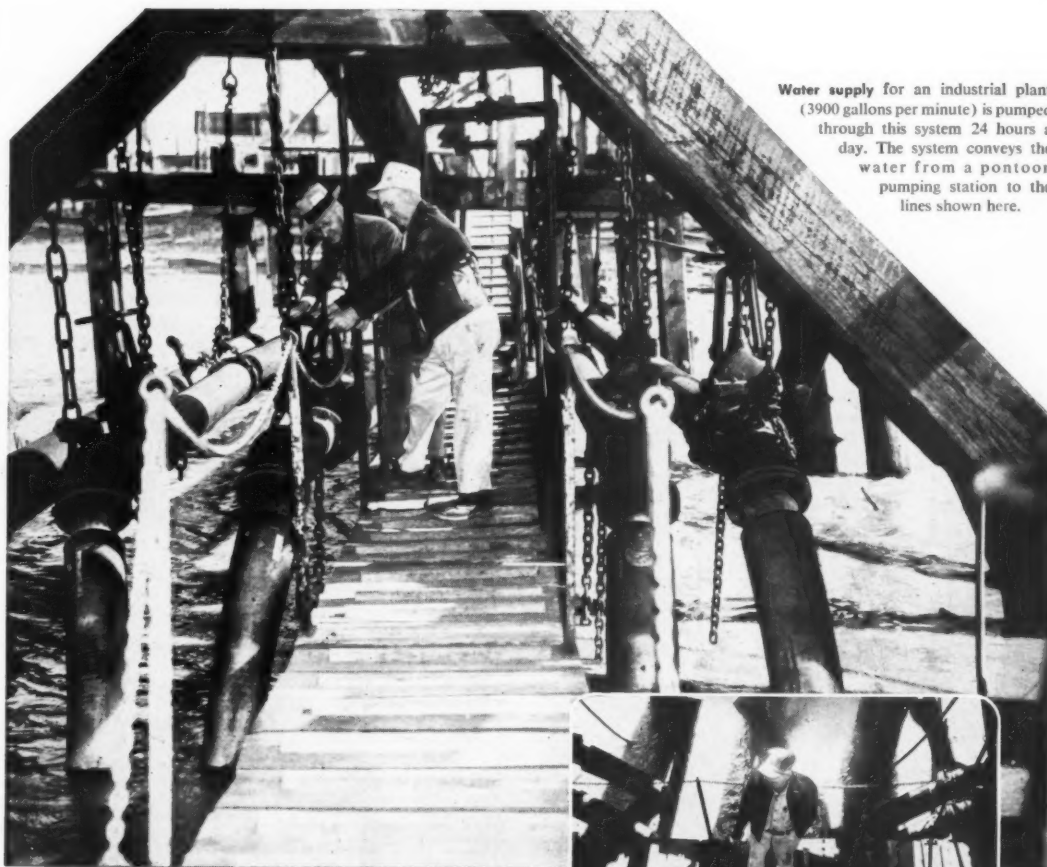
Bituminous Inspection

According to the testing engineers, bituminous design, inspection, and testing are considerably more complicated than concrete. In addition to aggregate, the very fine filler and the bitumen must also be analyzed. With the characteristics of the ingredients and the general type of road design known, the assistant testing engineer makes a theoretical trial batch in the lab. If this batch meets the standard stability tests it is adopted as the design.

At the asphalt plant, the inspector watches the scales, checks all equipment, and makes the standard Hub-

(Concluded on next page)

What's U. S. Rubber doing to handle the rise and fall of Mississippi water?



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Lab Keeps Close Tab On County Road Work

(Continued from preceding page)

hard-Field test on molded plugs. This test is made twice a day, except on the first day when the testing assistant may make as many as 20. These first-day tests by the same man who analyzed the ingredients and designed the mix make it possible to keep an up-to-the-minute check on the quality of the pour before road construction gets very far.

In case the routine checks at the plant should not tell the whole story, samples are analyzed from the newly laid mixture. This type of analysis completely breaks down the asphalt sample into its basic constituents—coarse aggregate, fine aggregate, filler, and bitumen.

Three methods are available in making the breakdown. The quickest uses the Dulin Rotarex machine which separates the treated asphalt by centrifugal action. The copper retort and Soxhlet methods utilize condensing vapors. In each case the asphalt plug is completely broken down and the aggregate gradations checked against the design.

In 1951 the small staff cured and tested over 400 concrete cylinders, and designed 59 concrete mixes and 41 asphalt mixes. They inspected about 10,000 yards of concrete and 21,000 tons of asphalt. Sixty-four aggregate analyses were made, and 3,500 feet of concrete pipe inspected.

Booth estimated that almost \$30,000 of lab work alone was done in 1951 and he anticipated this would rise to \$50,000 this year.

Put your scrap metal to work for increased steel production.



Recipients of the AGC safety awards in western Pennsylvania, left to right: Ralph W. Miller, Edward Reason, Howard B. King, Charles H. Booth, Jr., William R. McQuade, Russell C. Swank, and Howard H. Sturdy.

Pennsylvania Firms Win Safety Awards

Eight firms in western Pennsylvania were honored for outstanding safety achievement by the Associated General Contractors of America. Thurman C. Tejan, Executive Secretary of the Constructors Association of Western Pennsylvania, awarded the certificates and one plaque at a luncheon in the William Penn Hotel, Pittsburgh, on April 23. Recipients were:

Ralph W. Miller, District Representative of The Holmes Construction Co., Inc. (second place for best 10-year record, Heavy Division, and third place, Heavy Division, Group A); Edward

Reason, President of the Reason Construction Co., Inc. (no lost-time accidents, Heavy Division); Howard B. King, Vice President, Burrell Construction & Supply Co. (second place, Heavy Division, Group A); Charles H. Booth, Jr., Vice President, Burrell Construction & Supply Co. (plaque for best 5-year record, Highway Division, first place); William R. McQuade, President, James H. McQuade & Sons Co. (no lost-time accidents, Heavy Division); Russell C. Swank, President, Freeland Construction Co. (no lost-time accidents, Highway Division); Howard H. Sturdy, Vice President, Dravo Corp. and General Manager of the Contracting Division (third place for best 10-year record, Heavy Division; and second place, Heavy Division, Group A); Joseph J. Kissane, Jr., President, M. O'Herron Co. (no lost-time accidents, Highway Division).

Mr. Kissane was the only recipient who was unable to be present at the luncheon. The accompanying photograph shows the other seven.

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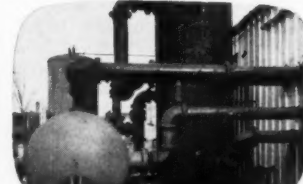
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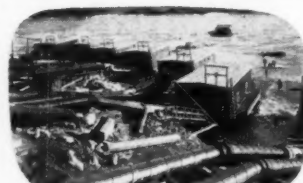
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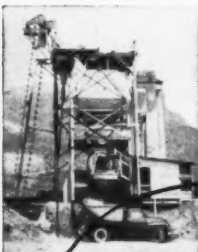


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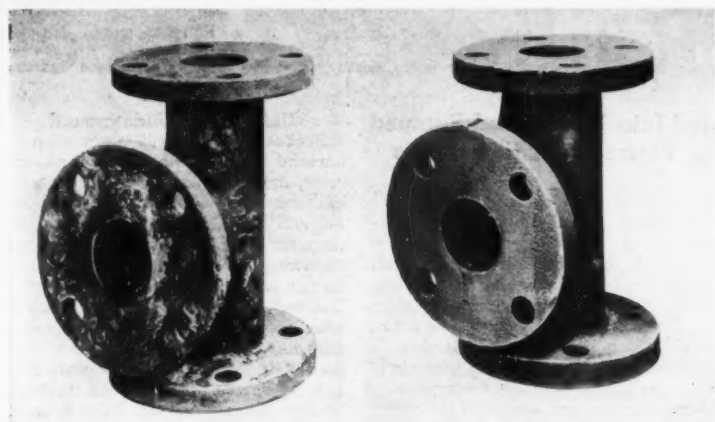
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Rustclean 12 is applied by sponge or brush, while Rustclean 15, a more concentrated compound, is used in an immersion process in a stainless-steel tank lined with rubber, polyethylene, or asphalt. No. 15 is most effective when used at a temperature above 160 degrees F. Rustclean is safe to use, according to Octagon; it contains a mild acid which offers very little hazard.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 245.

Truck-Mounted Drill

A combination drill which offers rotary, auger, and percussion drilling on the same rig has been developed by Mobile Drilling, Inc., 960 N. Pennsylvania St., Indianapolis, Ind. Mounted on a 4-wheel-drive truck, the hydraulically operated B-36 augers holes from 2 to 10 inches in diameter through shale, hardpan, gravel, and clay. An adaptor permits either vertical or horizontal drilling at a rate of about one foot per minute.

The tubular drill mast nests in the tube members of the drill carriage for cross-country travel, with a maximum over-all height of 10 feet. It telescopes hydraulically, with the feed cylinder, to an operating height of 16 feet.

The Mobile drill can be furnished with an auxiliary cat head, sand reel, and special high-pressure water pump. The maximum depth for auger drilling without water is approximately 150



The B-36 Mobile hydraulically operated drill, shown here on a Willys-Overland one-ton truck, offers rotary, auger, and percussion drilling.

feet; depth for rotary drilling with water is in excess of 300 feet.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 158.

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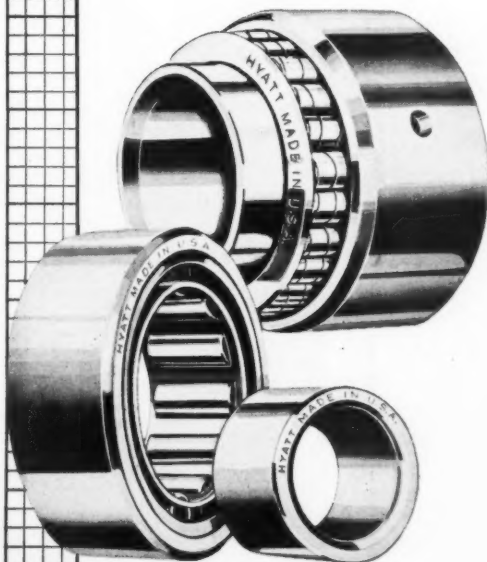
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roughest, toughest job without loss of time. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

HYATT ROLLER BEARINGS

Lining This Railroad Tunnel

• EXCAVATING and shoring for the construction of the new Baltimore & Ohio Railroad tunnel No. 1 near Clarksburg, W. Va., was a slow and laborious operation in comparison with the placing of concrete for the 22-inch wall lining. Boring through a stratum of shale and slate, and an abandoned intersecting coal seam, required the use of closely spaced steel rib bracing and large amounts of timber cribbing. All this support work took time.

Lining the tunnel with concrete, however, resolved itself into pretty much of a mechanical assembly-line sequence. From a central mixing plant, set up close to the east portal, concrete was hauled into the tunnel, discharged onto a conveyor belt, and fed to a Rex Pumpcrete machine that pumped it through a pipeline to 40-foot sections of collapsible steel forms.

The tunnel is on the Monongah Division of the Parkersburg Branch of the B. & O., and is about three miles east of Clarksburg. This branch carries both passenger and freight traffic between the East and the midwestern cities of Cincinnati and St. Louis. A new tunnel was deemed necessary to protect the continuity of railroad operation, since the condition of the existing tunnel required a maintenance gang on duty 24 hours a day.

A Bigger and Better Tunnel

Slicing across the hill through which the railroad is bored is the well known Pittsburgh coal seam. Mining has long since depleted the vein, and even the pillars and posts supporting the roof have been removed, leaving only a void that once was occupied by the deposit of coal. Settlement affecting the entire area has occurred in the old vein. The lining of the original tunnel has been subject to dislocation through the heaving and squeezing of the ground around, and has needed constant attention.

To improve service, the new tunnel—located about 450 feet south of the original single-track tunnel—carries a double track. Its grade is also flatter—0.3 per cent uphill toward the west of Clarksburg, as compared to the 0.67 per cent grade in the old tunnel. Laid out nearly east and west, there is a difference of less than 10 feet in elevation in the 3,236-foot length of the new

Concrete From Mix Plant Is Hauled Into Tunnel and Pumped Behind 40-Foot Sections of Steel Forms for 22-Inch Walls

structure. Top of rail at the east portal is elevation 1,078.62, while the similar point at the west portal is 1,088.32 elevation. The old tunnel is more than 500 feet shorter with a total length of 2,710 feet. Both tunnels are more than 500 feet below the summit of the hill which is at elevation 1600.

Beyond the portals of the tunnel the new alignment swings back to the old location on easy curves and grades. Material excavated from the approach cuts served as fill for the new embankments. Grading and the approach cuts were handled by the Keeley Construction Co., Inc., of Clarksburg, W. Va., which started work on the project in May, 1950. The general contract for the tunnel went to Bates & Rogers Construction Corp. of Chicago, which began operations in September, 1950. The B. & O. expects to have the tunnel completed by the middle of this year. Total estimated cost of construction is \$4,000,000.

Cross Section

According to the typical cross section of the double-track tunnel, the clear inside horizontal span is 31 feet, while the horizontal pay limit is 36 feet. From the top of the rails the clear height to the crown of the finished tunnel is 28 feet. The radius from the spring line to the inside of the concrete is 15 feet 6 inches, while the radius of the pay limit is 18 feet.

For its entire length the tunnel is supported with steel ribs and plates supplied by the Commercial Shearing & Stamping Co. of Youngstown, Ohio. Ribs have an average spacing of 2 feet on centers, but in places where greater pressure was encountered the spacing was reduced to 1 foot on centers. Ribs are 10-inch WF 39-pound sections that are tied together with steel purlins and 3/4-inch tie rods. Liner plates of 1/2-inch gage enclose the arches above the spring line.

The 22-inch concrete lining for the side walls and roof of the tunnel encloses the 10-inch ribs; the 12 inches remaining of plain concrete lies inside the steel. While there is no concrete floor or invert to the tunnel, there are

two poured-in-place ballast walls, one along each side of the tunnel, to contain the 3-foot layer of stone ballast on which the double tracks are laid; tracks are 14 feet apart on centers. Between the ballast walls and the sides of the tunnel are concrete gutters, semicircular in shape and lined with half sections of 18-inch-diameter vitrified-clay pipe. The lining was necessary because of the acid nature of the water draining into the tunnel, and the corrosive action it exerted on the concrete.

Unfavorable Underground

Because of this acid water with its harmful effect on steel as well as concrete, the liner plates above the spring line were coated with Oxy-Gard AC 149 and Uni-Lox 632. These preparations for protecting the metal were put on with a spray gun. Below the spring line, a wall of 1-inch timber lagging, laid out horizontally, was built up in back of the rib posts and secured to the steel. Crushed limestone was packed in between this wooden form and the sides of the cut; the thickness of the packing varied from 8 to 24 inches.

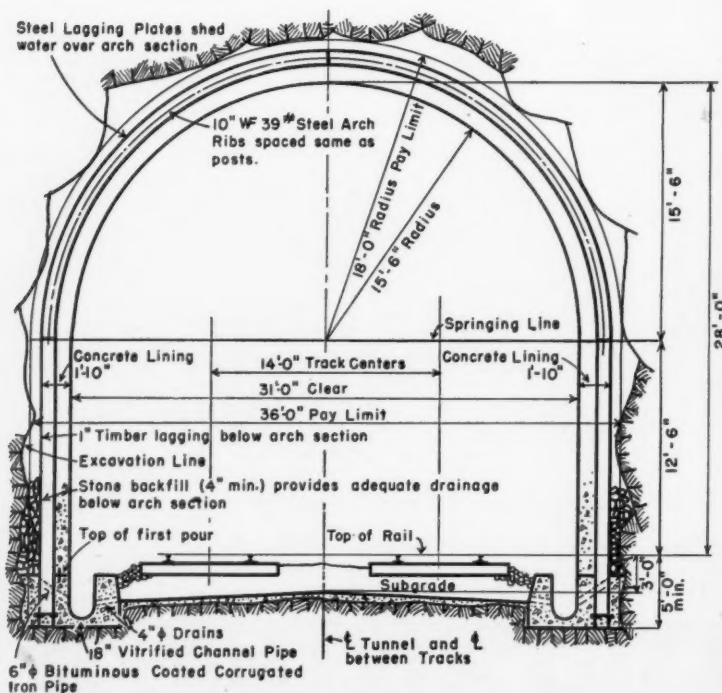
Thus the ground water, cut off by (Continued on next page)



1. Tunneling progress was steady until Bates & Rogers workers broke through into an old coal mine. Here, beyond the drill jumbo, is a pile of muck from the old holdings.

B. & O. Railroad Photos

2. With the extra cribbing and shoring required in the unstable seam, bore footage fell from 350 to 100 a month. This view shows cribbing on the north side in the old mine.



TYPICAL SECTION



1 Goes Easier Than Digging It

By WILLIAM H. QUIRK

Eastern Editor

the tunnel, seeped into the limestone and filtered down to the bottom of the packing. Downward-slanting 6-inch-diameter weep holes through the 22-inch concrete lining drained the water into the lined gutters within the tunnel. It also was originally intended to backfill the area above the spring line with dry-stone packing, but the over-break and scaling in the roof sections was so great that timber cribbing, along with the dry-stone packing, was used to fill up the space. In some locations the timber cribbing, which of course was left in place, reached a

height of 12 feet above the liner plates.

During the digging of the tunnel, the gray shale and slate formation was hard at the start but softened in the presence of air and water and took on some of the characteristics of clay. Free-flowing water was encountered in abundance through most of the job, but the old coal mine was the biggest problem that nature tossed at the tunnel builders. Besides acidifying the surrounding water, this 9-foot seam bisected the line of the tunnel. From a point above the tunnel at the east portal, the worked-out vein sliced down through about the mid-point, to the level of the west portal. Under such conditions it was obvious that tedious

shoring and supporting of the tunnel would be necessary behind every foot of mucking.

Full Face at First

For the most part the tunnel was bored from the east end, working on the slight uphill grade to drain the water off to the portal. During the early part of the job the full face was worked, and the average length of the round pulled was 8 feet. Bates & Rogers built a drill jumbo that rode on rails placed 23 feet apart on centers. From the rails to the top of the main platform the jumbo was 21 feet 6 inches high; its length was 33 feet 5 inches. It had a steel framework with timber

platforms to accommodate the drills.

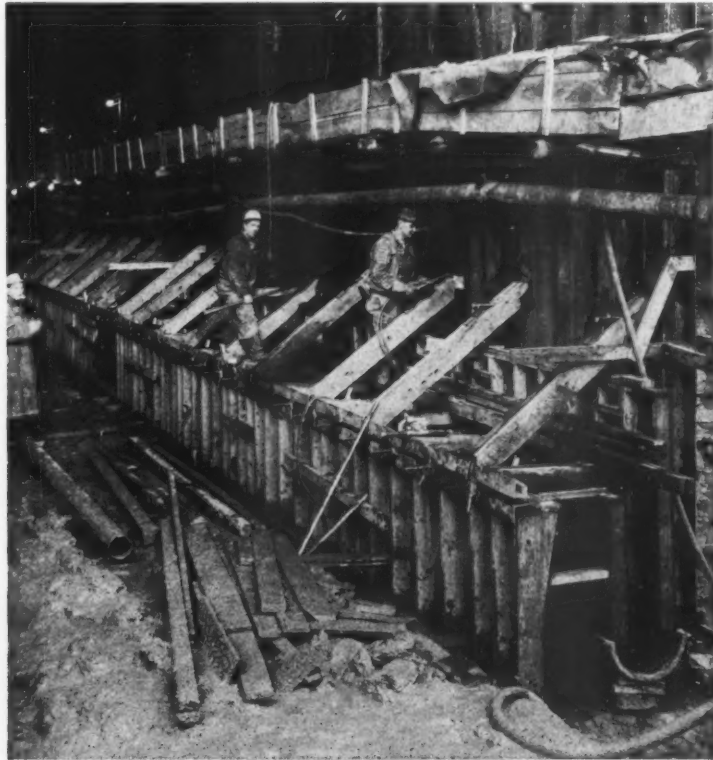
At the front end of the jumbo, and 5 feet 8 inches above the main upper platform, was a smaller platform 12 feet wide x 8 feet 9 inches long to support the crown drill. Including the crown drill there were 11 Ingersoll-Rand D35 drifters working off the jumbo. Mounted on bars across the bottom were 4 drills to take care of the lower hole lifters. Above each of the two bottom side drills were two other drills supported on hinge platforms dropped from the sides of the jumbo. These platforms, two on a side, were equally spaced as to height between the bottom of the jumbo and the

(Continued on next page)



2. Full-face tunneling gave way to heading and bench-type methods. Pictured here is a heading or drift in the tunnel crown, showing timbering ahead of steel.

4. And now, from the end of the crown drift, looking east at the steel. Both these pictures above and below, were taken at station 1,036+74 in the tunnel.



5. Concreting was much easier than drilling. You're looking now at forms for the ballast wall and gutter along the north side of the tunnel, which were poured first.

6. For the lining, this 40-foot collapsible traveling Elaw-Knox form was used. A Keshring 304 crane is shown erecting it outside the east portal.



Lining This RR Tunnel Easier Than Digging It

(Continued from preceding page)

upper main platform, which also supported two drills. The seven drills on the platforms were mounted on booms.

Drill steel, 1 1/4 inches in diameter, started with 4-foot lengths, and increased by 2-foot increments to a maximum of 20 feet. I-R bits were used, decreasing from 2 1/4 inches to 1 1/2 inches. For full-face operations as many as 190 holes were drilled. They were charged with 40 per cent gelatin dynamite, either Austin, Hercules, or Atlas, and fired with Du Pont exploders using up to 11 delays. For every linear foot of tunnel about 42 cubic yards of rock was excavated.

Plant

Six Gardner-Denver 510-cfm compressors supplied air for the drills at 95 to 110-psi pressure. Each compressor was driven by a Westinghouse

125-hp electric motor. They were laid out in two banks of three each on concrete foundations, and housed in a metal shed. A 6-inch line ran from each bank to a receiver, and from there an 8-inch line along the north side of the tunnel brought the air to the drills at the heading. Compressors could operate individually or all together according to the air requirements. Water for the drills was carried along the same side of the tunnel in a 2-inch pipeline. Water from springs was stored in a pressure tank set up on the side-hill over the portal, and from this elevated position the line dropped down to the tunnel lever and then went up to the heading.

An I-R blower, powered by a 200-hp electric motor, supplied ventilating air to the heading at the rate of 21,000 cfm. A 36-inch welded-steel pipe ran from the blower, outside the portal, up the south side of the tunnel to the heading. After a blast the foul air was sucked out, and then the unit was reversed and clean fresh air blown into

the tunnel.

Another key building included in the plant setup was the blacksmith shop, where the drill steel and bits were serviced. Equipment consisted of an I-R grinder, sharpener, and forge, and an Oster Pipe Master unit. Local utilities supplied power and light, and both

220 and 440-volt lines went into the tunnel.

Mucking

Mucking at the east heading was handled with a Lima 802 shovel. Its dipper stick was cut down to 19 feet

(Continued on next page)

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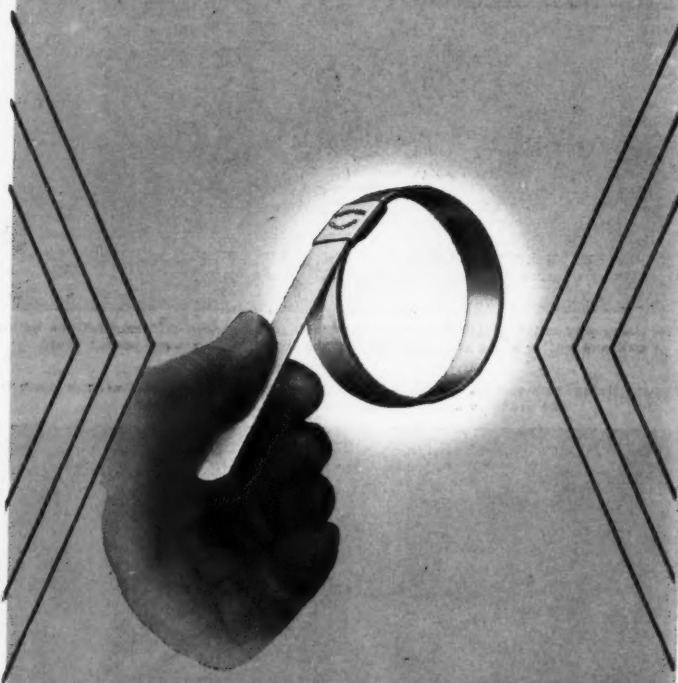
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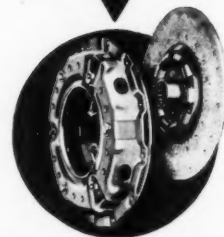


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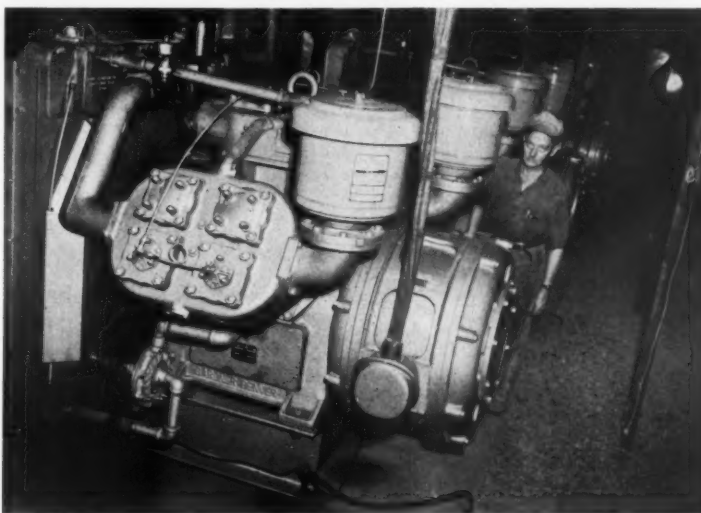
and it carried a 2-yard bucket. Two end-dump Euclids and two Tournarockers hauled the rock away, averaging 8 to 9 yards a load. Haul distance out to the embankment where fill was placed was slightly more than 1/2 mile. The shovel and hauling units slipped under the drill jumbo with plenty of clearance room when the side platforms were pulled up out of the way. Total excavation, which was unclassified, was estimated at 137,000 cubic yards for the tunnel. Material for grading the approaches was estimated at 435,000 cubic yards; this yardage included the work at the portals.

Setting of the steel ribs and plates followed right behind the mucking operations. Erection was done from the drill jumbo, the heavy members being lifted to position by an I-R pneumatic tugger hoist. The pans or liner plates above the spring line were placed from the upper platform. Another jumbo was used to install the 1-inch horizontal lagging along the sides, and the dry-stone packing behind the timber and above the roof plates. A Caterpillar D7 tractor moved the jumbo about as needed.

Progress with the tunneling had been steady from the start of operations in mid-September, 1950, until the miners broke through into the old coal mine in mid-January, 1951. Until then the tunnel was being bored full face at an average rate of over 350 feet a month. Entrance into the abandoned and sagging seam slowed the advance at once, and with all the extra shoring that was required, the monthly rate dropped off to about 100 feet. In the east heading the contractor worked two 10-hour shifts a day, six days a week.

A Change in Methods

Because of the voids and the un-



C. & E. M. Photo

Here are three of the six Gardner-Denver compressors which supplied air for the tunnel drilling on the Baltimore & Ohio project.

stable stratum overhead, the full-face method of tunneling was changed, and the heading and bench type of boring was used. A heading or drift in the crown of the tunnel was drilled first to a width of about 6 feet and 8 feet high. Three 6-foot rounds pulled this first heading 18 feet ahead as the mucking was done by hand. Rock was loaded into some old horse-type scraper pans, pulled out with the air tugger, and dropped over the face of the tunnel where it was handled by the shovel as before.

From this initial cut the heading fanned out to the sides, and the roof was supported on an intricate system of cribbing. Ten crown bars made up the main support. They were oak tim-

bers, either 10 x 10's or 12 x 12's, from 18 to 24 feet long, that spanned the area being shot out in the bench below the heading. The crown bars extended out from the last ribs that were placed in the arch, and were supported at the far end by stulls or posts. Over their tops was placed an interlacing pattern of timbers, usually 5 x 7's, supporting spalling boards either 1-inch or 2-inch stock. This cribbing was wedged up into place from the bottom of the posts.

Sections of steel arch were then pulled up to the jumbo platform by the tugger at the rear, moved to the front, and set in place. All the timber cribbing, except the stulls, was left in place as the steelwork moved ahead.

Different Shooting Pattern

The bench below the heading was taken out in 6-foot rounds, with the number of holes naturally reduced from the full-face method. A typical round of 138 holes was dispersed with

(Continued on next page)

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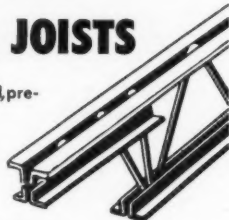
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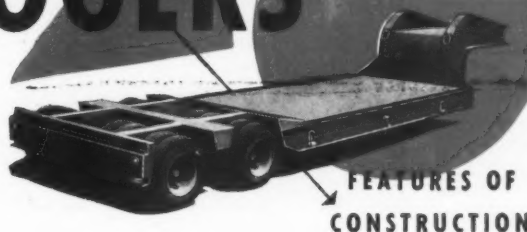
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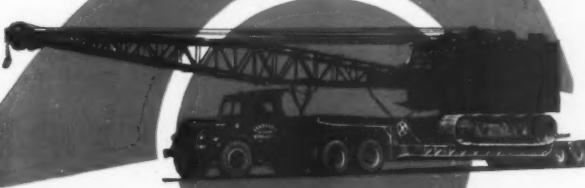
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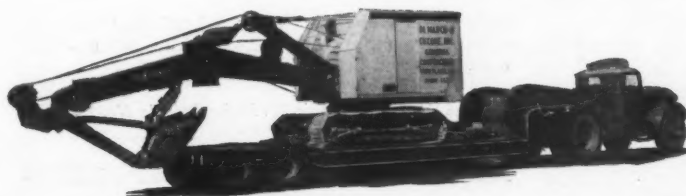
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Lining This RR Tunnel Easier Than Digging It

(Continued from preceding page)

the following delays:

Delay No.	Holes
Instantaneous	12
No. 1	6
No. 2	8
No. 3	10
No. 4	21
No. 5	22
No. 6	21
No. 7	12
No. 8	12
No. 9	9
No. 10	5

Of the 12 instantaneous shots, 6 were at the center to form a wedge cut. Some holes were drilled with jackhammers from the crown vertically into the bench to a depth of 7 feet 4 inches. Altogether this shot required 868 linear feet of drilling, and 425 pounds of powder were used. The muck amounted to 248 yards, resulting in an average of 1.7 pounds of powder to every cubic yard.

Steel supports for the tunnel totaled



C. & E. M. Photo

A Dumpcrete on a Hendrickson truck is loaded with 2 yards of concrete from a Smith mixer, for transport to the tunnel.

at a time, after which the steel liner was erected. The drifts were carried in three 8 foot cycles before the core was removed. Practically no shooting was done and such drilling as was involved was done with a few drifters and jackhammers, with the air supplied by a pair of Chicago Pneumatic 315-cfm portable compressors. The jumbo for drifters was a smaller rig than that used in the east heading.

When the center core was excavated, the mucking was done either with a Bay City 1 1/4-yard shovel with a shortened dipper stick or a Hough 1 1/2-yard Payloader. A D6 dozer worked around the loaders, and the rock was hauled away in Euclids.

Concrete Plant

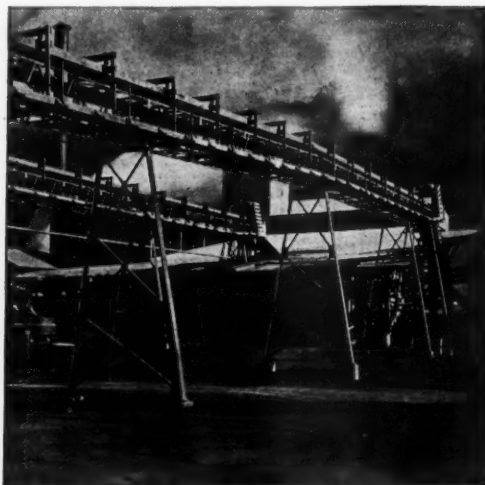
Concrete for the job totaled 29,000 cubic yards. For the west portal transit-mix concrete was delivered from Clarksburg, and placed with crane and bucket. But all the rest of the concrete was mixed on the project in a plant set up near the east portal. All the lining for the tunnel was done from the east end. The Ohio River Sand & Gravel Co. of New Martinsville, W. Va., supplied the aggregate, while the B. & O. furnished Alpha bulk cement from Mannheim, W. Va.

Materials were delivered by rail to a siding that served the Butler batch plant. Aggregate was loaded into a hopper by a Hough Payloader, and lifted 80 feet on a bucket conveyor to a four-compartment bin at the top of the plant. Below the bin was a plat-

(Concluded on next page)

3,850 tons, or approximately 2,331 pounds per linear foot.

It was apparent that additional difficulties would be encountered in constructing the west portal, and operations were therefore started from that end, working one crew a single shift. The excavation at this end was practically all done by hand, using a method consisting of side drifts, crown drifts, and fanning out between the side and crown drifts. The side drifts averaged 6 feet in width and advanced 8 feet



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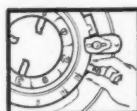
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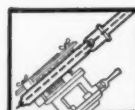
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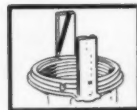
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form supporting a Smith 2-yard mixer that emptied out into a 2-yard hopper. At the plant Pozzolite was added to each batch at the rate of $\frac{1}{2}$ pound per bag. From the hopper, concrete was loaded into 4-yard Dumpcetes mounted on Hendrickson trucks. Three of these units carried the mixed concrete into the tunnel.

There they discharged their contents into the forms for the ballast walls, which were poured first. In this initial pour the side lining was also placed up to the level of the rails, thus including the section that enclosed the weep holes. Work on the ballast walls started on April 18, 1951. During the construction of the ballast walls, anchor bolts were embedded into the lower section of the side walls for the future support of the form to be used in the lining. As the concrete was placed it was vibrated with Maginniss electric vibrators.

Tunnel Lining

A Blaw-Knox steel form, 40 feet long, was used in placing the 22-inch plain-concrete lining for the tunnel. This collapsible form accommodating both the arch and the sides rode on the rails, six wheels to each side. The main bracing scaffold was lifted into place by six Blackhawk hydraulic jacks, three on each side, while the weight of the form was then borne by 20 other jacks, 10 on each side, that rested on the ballast wall. The form and the concrete it upheld weighed about 180 tons. Before any concrete was placed, the steel sides of the form were sprayed with paraffin oil.

In constructing the lining, the Dumpcetes discharged their loads onto a conveyor belt, 30 inches wide x 50 feet long. This fed the hopper on a Rex 200D double Pumpcrete, which pumped the concrete to the forms through an 8-inch pipeline. The Pumpcrete machine was mounted on a jumbo that also rode the rails. The discharge line, also secured to the jumbo, curved upward to the top of the form where it discharged the concrete. The outlet was kept buried under the concrete, and as the form filled up the entire jumbo was pulled away, the pipe with it. The jumbo was moved by means of a cable and winch hooked to the steel ribs.

The form was left in place until the concrete had hardened, then the jacks were released and the sides pulled in at the bottom to permit its removal to another section. Copper water stops were installed at each 40-foot joint. Tunnel lining started on July 25, 1951, and the concrete placing caught up with the drilling, mucking, and shoring in a short while.

While the gutters along the sides handled the drainage in the tunnel very nicely, a pair of Goulds electric-driven reciprocating pumps were stationed at the heading to divert the water into the outlets. I-R sump pumps were also scattered about to dry up some wet spots.

Personnel

Bates & Rogers Construction Corp. employed an average force of 200 in the construction of the double-track railroad tunnel. Key personnel included M. C. Warmbier, Project Manager; Carter Fore, Superintendent; D. M. Carlisle, East-End Night Walker;



C. & E. M. Photo

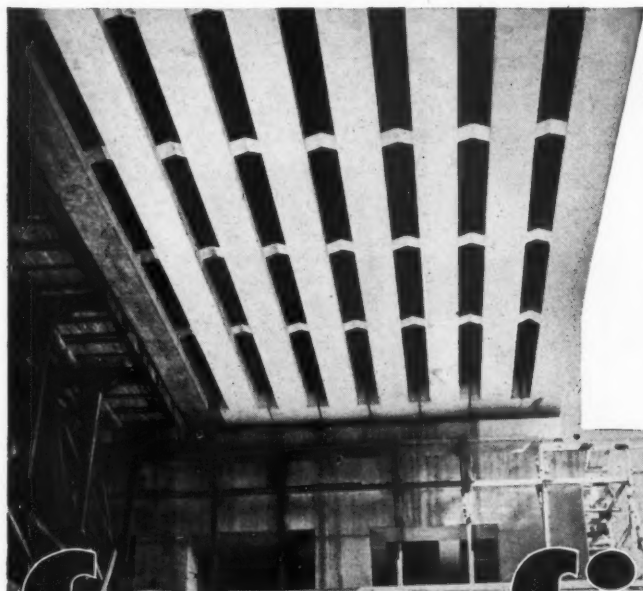
J. W. Packman (left), Project Engineer for the B. & O., and James W. Pack, Day Walker—in front of the west portal.

James W. Pack, West-End Day Walker; Larry Wesley, Superintendent of Equipment; and V. W. Short, Office Manager.

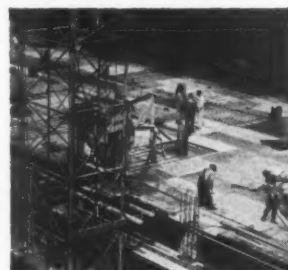
The project as a whole was under the general direction of A. C. Clarke, Chief Engineer, with general supervision by W. W. Gwathmey, Jr., Engineer of Construction. C. L. Kroll, Regional Engineer, was in direct charge of the job with G. E. Norris as his Resident Engineer and J. W. Packman, Project Engineer.

Hewitt-Robins' New Office

Hewitt-Robins Inc., Stamford, Conn., manufacturer of conveying and vibrating machinery, rubber hose, and belting, has opened a new office in the Porter Bldg., 406 W. 34th St., Kansas City, Mo. Robert E. Crane, Field Engineer, who has been with the firm 15 years, is in charge there and represents three of the four corporate divisions; Hewitt-Rubber, Robins Conveyors, and Robins Engineers.



clean, smooth beams and piers of pre-stressed concrete



smooth concrete industrial building surfaces

to produce a clean, smooth concrete finish use

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freedom from staining on apartment project

All over America contractors report that Formfilm is the practical and economical answer for the protective coating of valuable plywood forms. Since it is easily applied and reapplied on the job, Formfilm has many advantages over any other protective finish for concrete forms. Heavy scratches for instance, can be quickly recoated when Formfilm is used at the job. Formfilm is now being widely used in "tilt-up" construction.

ADVANTAGES OF FORMFILM

- Increases speed of form handling
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- Eliminates all disadvantages of oil or oil deposits on concrete
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Manufacturers of materials for building maintenance and construction
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Engine, belt, and electric driven pumps with many new features to give you outstanding performance at low cost. A.G.C. rated. Write for special bulletins.



RICE PUMP & MACHINE COMPANY
120 N. Milwaukee St. Grafton, Wis.

Derrick Boats Dredge Trench for Pipeline

Heavy Pipe Used, Coated Against Corrosion; Winched Across River; Four River Crossings in All

By WILLIAM B. BEER, Engineer, The Contracting Division, Dravo Corp.

• AN ever-increasing number of pipelines are being constructed across the United States to supply the rising demand for oil, gasoline, and natural gas. These lines have to cross mountains and valleys, and go through forests and swamps. Perhaps the most difficult job, though, is taking the pipe across rivers.

Typical of such projects is one being carried on for the Tuscarora Oil Co., Ltd., Harrisburg, Pa. The job consists of renewing and enlarging an existing

line between Tuscarora's pump station in the vicinity of Esso Standard Oil Co.'s Bayway Refinery at Linden, N. J., and a river terminal at Midland, Pa. During normal times crude oil is taken in ocean-going tankers to New Jersey, where it is refined. The finished products are piped to various terminals en route and thence to Midland to be distributed locally and by barge on the Ohio and Mississippi River systems. In wartime, however, when ocean shipping of oil was very hazardous, the Tuscarora system was reversed to deliver crude to the Bayway Refinery to be refined.

Four River Crossings

It was desired to install a lateral line to deliver into the Pittsburgh area direct. For this reason, the new line departed from the old right-of-way near Freeport, Pa., to swing near Pittsburgh. This necessitated four river crossings—No. 1 across the Allegheny River at Godfrey, Pa., near Freeport; No. 2 across the Ohio River

at Leetsdale, Pa.; No. 3 across the Ohio at Midland, Pa.; and No. 4 across the Allegheny at 35th Street in Pittsburgh. The Contracting Division of Dravo Corp., Pittsburgh, was low bidder on the first three contracts. The fourth contract had not been let when this was written. Similar methods were used on all three crossings.

Depth of Pipeline

The Department of the Army, Corps of Engineers, which has jurisdiction over inland rivers, requires that any pipeline be placed at least 3 feet below the existing or proposed channel depth and be covered at any point in the river bottom with a minimum of 3 feet of material.

At Leetsdale, Pa., the pipeline was to run diagonally upriver on the Ohio from the left to the right bank, approximately 2,000 feet below Dashields Dam and Lock. The water-level distance from shore to shore was approximately 1,400 feet. The excavation of the pipe trench involved approximately

11,000 cubic yards, including considerable access dredging required to float derrick boats close to shore. Two C-14-type derrick boats were used. These were steam-driven revolving cranes with 14-foot-diameter roller circles mounted on hulls 40 feet x 40 feet x 4 feet 9 inches. Each derrick boat had anchor spuds, a 75-foot boom, and a 1½-cubic-yard clamshell bucket.

(Continued on next page)

Keeping a road-razor honed...



Up to six times longer with Airco Hardfacing Alloys

Grading, the final touch to highway construction... or the end of the back-fill on any construction job... poses tough problems for 'stay-on-the-job' equipment.

Rocks and low-grade fill lie ready to chew the finest scraper blades... unless they are pre-protected with one of the many Airco Hardfacing Alloys available for extending the "sharpedge" life of your equipment as much as

six times longer than ordinary scraper blades.

But no matter what your wear problem, it will pay you to look into the more than twenty Airco Hardfacing Alloys for your tools and parts. Any Airco representative will be glad to give you complete information. Write or call your local Airco Office today.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND



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DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

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PRINCIPAL CITIES



Specify LE-HI for all Hose Couplings!

Wherever hose is used there is a LE-HI hose coupling to match—from small tubing to large industrial applications... The complete LE-HI line includes:

- Air Tool Couplings
- Welding Hose Couplings
- Steam Hose Couplings
- Fire Hose Couplings
- Acid Hose Couplings
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- Drilling Hose Couplings
- Oil and Gas Hose Couplings
- Agricultural Hose Couplings

... plus complete lines of hose clamps, air valves and manifolds.

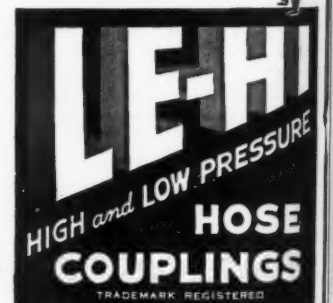
Sold through leading distributors and rubber manufacturers only.

"Old Doc" says: "Write now for your free copy of the complete LE-HI catalog"

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Philadelphia, Pa.

LE-HI Makes a Good Connection!



Now!

BUY used equipment
SELL used equipment
ACQUIRE competent personnel

through

The Trading Post Section of
CONTRACTORS & ENGINEERS MONTHLY

See page 119

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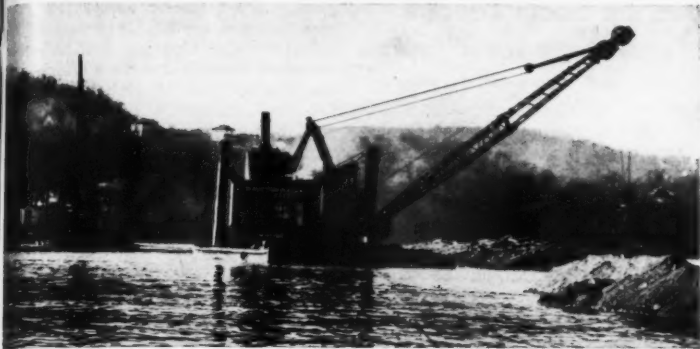
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Dravo Corp. Photo

Dravo Corp., Pittsburgh, Pa., used derrick boat No. 23, a C-20 revolving crane with a 90-foot boom and a 5-cubic-yard bucket, to do difficult digging in the Ohio River. A smaller C-14 handles other excavation in the background.

Difficult Digging

When it was discovered that the river bottom was cemented slag and gravel for 300 to 400 feet out from the right bank, it was decided to bring in a larger derrick boat for this very difficult digging. This was derrick boat No. 23—a C-20 revolving crane with a 20-foot roller circle mounted on a 62 x 54 x 7-foot hull with a 90-foot boom and a 5-cubic-yard clamshell bucket.

Targets were set up on line at each shore. One derrick boat began dredging at the left bank and one just outside the slag at the right bank. Both derrick boats worked riverward. The large one began 400 feet out in the river to dredge an access channel shoreward and then dredge the pipeline trench on the way back. Pipeline Construction & Drilling Co. of Camp Hill, Pa., was the contractor who laid all of the pipeline. The company started a backhoe from shore to dig a trench riverward for about 100 feet from the right bank.

The depth of the trench was determined by painted marks or cable clips on the clamshell-bucket hold line. Distance from shore was determined by lines radiating from a hub downriver from the pipeline on the right bank. These lines were marked by stakes on the shore and where each line intersected the pipeline, the point of intersection coincided with a change of slope in the ditch bottom.

The major portion of excavated material was deposited downstream from the pipeline to prevent its washing away during high water and refilling the trench. Care was taken to have plenty of depth for towboats to pass in

the channel without scraping bottom.

Heavy Pipe, Anti-Corrosion Coat

While the trench was being excavated, the Pipeline Construction & Drilling Co. was preparing the pipe. The pipe for the river crossing had a 10 3/4-inch outside diameter and 1/2-inch wall; it was seamless and made of Grade A low-carbon steel. This heavy pipe was used for three reasons. (1) Its weight (15-foot-pounds in the water, empty) helps it to lie in the bottom of the river. (2) The thick walls will delay any corrosion failure. (3) It is very ductile and flexible.

A large fairly level area was cleared on the right bank of the river. The 1,700 feet of pipe were then welded into three 500-foot lengths and one 200-foot length. These pieces were cleaned and primed by a Perault cleaning and priming machine. Then dope and Fiberglas were applied in three successive layers by a Perault Dope

(Concluded on next page)



Jobs Done Quicker, Cheaper

Attached to Tractors, Bulldozers, Motor Graders and Scrapers, the Automatic Slope-Meters are in use on the construction of highways, airports, dams and building sites. Slope-Meters are compact, sturdily constructed instruments that will automatically show the operator the exact grade or slope on which he is working.

Order from Your Equipment Distributor Today

OR
THE SLOPE-METER CO.
EXCELSIOR, MINNESOTA



Dravo Corp. Photo

The 10 3/4-inch pipeline, wrapped in a coating of 1 x 2 oak slats, is ready for laying across the Ohio River near Leetsdale, Pa.



Hey Boss!
Here's that NEW
DUFF-NORTON
"Shorty"
JACK



No. 1507

... and it's a Honey!



*"It's only 7" high
and weighs only 22 lbs."*

**IT WILL PAY TO HAVE SEVERAL
ON EVERY CONSTRUCTION JOB**

Yes, Boss, you should have one or more Duff-Norton "Shorty" Jacks. Its low height of only seven inches and light weight make it the most versatile jack in our complete line. It can be spotted under equipment too low for other jacks. It will raise 15 tons 2 1/2 inches with ease. Specify Duff-Norton "Shorty" on your next jack order. You'll want more of them when you see its outstanding performance.



*"It'll lift anything
with ease and safety."*

Write today for Bulletin AD-12-D.

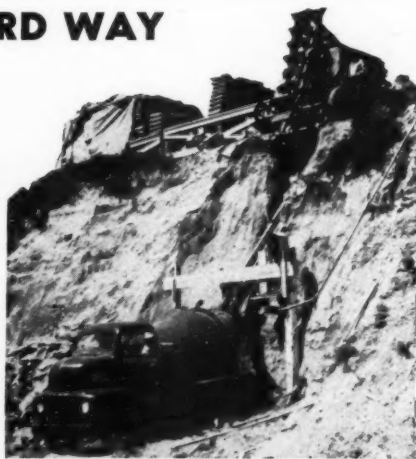
THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"



THE WILLARD WAY FOR OILFIELD CONCRETE



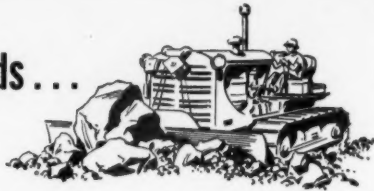
A Willard "Spread" consisting of Weigh Batch Loader and Truck Mixers handles batching, mixing, hauling and pouring concrete for mats and foundations in this booming oil field.

Move with the field on Willard wheels — the right mix at the right place at the right time and at the right cost.

Write for the "Willard Way" booklet.

Willard Concrete Machinery Sales Company
11700 Wright Road, Lynwood, (Los Angeles County) California

handling heavy loads...



Torrington Spherical Roller Bearings have the tremendous load capacity needed for reliable performance in heavy-duty construction machinery.

Made from the finest materials, properly heat-treated for long, trouble-free service, these self-aligning bearings have proved themselves both in original equipment and for service requirements.

THE TORRINGTON COMPANY

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TORRINGTON SPHERICAL ROLLER BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

Derrick Boats Dredge Trench for Pipeline

(Continued from preceding page)

machine. A coating of asbestos felt was applied with and over the last Fiberglas coating. The coatings were then tested to make sure an electric spark would not penetrate them. These coatings are mainly to insure against corrosion due to electrolysis. Next a coating of rock shield was applied and fastened with steel strapping. River weights of 1,100 pounds each were fastened at an average of 40-foot intervals and mats made of 1 x 2 oak slats wrapped around the pipe between the river weights and fastened with steel strapping.

Laying the Pipe

A bull plug was fitted and welded to the end of one pipe section. One of Dravo's derrick boats pulled a 7/8-inch cable across the river. One end of this cable was fastened to the bull

plug. A D7 tractor across the river was fastened to the other end of the cable and the pipe was pulled across the river with the tractor's winch. As the trailing end of each section approached the water's edge, another section was maneuvered into place with side-boom tractors and welded on.

When the pipe was pulled completely across the river, a diver, assisted by the derrick boat, walked the pipeline to assist in sounding it and to make sure no logs, timbers, etc., had fouled under it.

The pipe was then tested under water pressure of 800 psi to make certain there were no leaks, and a pig or go-devil was run through the pipe to make sure there were no dents in it.

Dravo then began backfilling over the pipe. River traffic, of course, was maintained at all times during the project. Banks and the river bottom were dredged and filled to as near original conditions as possible.

First-Aid Ointments

A new protection against mosquitoes and other insects is announced by Medical Supply Co., 1027 W. State St., Rockford, Ill. A small amount of Lotshaw's Pellent rubbed on the hands, neck, and face is said to keep mosquitoes, flies, ticks, chiggers, and other insects away for hours. It has a pleasant aroma, according to the company; there is no stickiness; it will not stain or harm clothing; and it does not come off easily with perspiration. Pellent comes in units of six 1/8-ounce nonleaking tubes with safety spear caps for easy application.

The company also announces a companion product, poison-ivy ointment, for protection against and treatment of ivy, oak, and sumac poisoning. It is also packed in units of six 1/8-ounce tubes and fits first-aid units.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 178.

Improved Welder Line

Three major improvements have been made in the line of arc welders manufactured by Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y. Silicone insulation, which protects against fire, moisture, and chemical fumes, increases overload capabilities. Capacitors in the secondary circuit provide an extra surge of current if the arc starts to go out. The third feature is an automatic hot-start device consisting of a simple relay and resistor combination connected across the transformer secondary in series.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 105.



The new arc welders made by Metal & Thermit come in 200, 300, 400, and 500-amp ratings.



in WIRE ROPE, too

It's all in the RIGHT KIND of Muscle

The powerful, rugged muscles of a charging rhino enable him to propel his tremendous bulk and weight at truly remarkable speed. Nature designed them well for the purpose they have to serve.

In wire rope, too, the right kind of muscle is vitally important... because different types of jobs present different types of destructive forces. Bending fatigue! Shock stress! Abrasion! Load strain! Each demands wire rope that best combines the required resistance characteristics.

Wickwire Rope gives you the benefit of long experience and specialized know-how which assures you of exactly the right kind of rope your particular job demands.

For additional information write or phone our nearest sales office.



LOOK FOR
THE YELLOW TRIANGLE
ON THE REEL

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PACIFIC COAST: THE CALIFORNIA WIRE CLOTH CORP.—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane

WICKWIRE ROPE



PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

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Montana Distributor Firm Expands

Western Construction Equipment Co., Billings, Mont., distributor of Heil road machinery and other construction equipment, has completed a 3,000-square-foot addition to its sales and service facilities at Billings. As well as doubling the size of the Repair Parts Department, the new building has added a showroom and a projection room for showing slides and movies of construction equipment at work.

Since President Harold M. Doolen founded the firm in 1940, Western Construction has grown steadily, and in 1947 a branch was established at Missoula, Mont. Lloyd J. Klingler is Sales Manager, and field salesmen cover the territory of Montana and northern Wyoming. Charles E. Blankenhorn, Jr., is a recent recruit to the ranks of the firm's sales representatives.

Two New Ones for Bil-Jax

Bil-Jax, Inc., Archbold, Ohio, manufacturer of Bil-Jax scaffolding, has recently appointed two new distributors, in Texas and California, thus putting its equipment outlets on a coast-to-coast and border-to-border basis of operation.

The new distributors are: Bil-Jax Scaffolding of Houston, 3121 White Oak Drive, Houston 7, Texas; and Palmer Equipment & Rental Co., Inc., 216 W. Los Feliz Road, Glendale 4 (Los Angeles), Calif. George W. Easley is in charge of the Houston firm, which handles Bil-Jax equipment in the entire state of Texas. Palmer Grasse is President of the Los Angeles firm, which will take care of the whole Los Angeles metropolitan area.

Ehrbar Opens in Philadelphia

Edward Ehrbar, Inc., 29 Meserole Ave., Brooklyn, N. Y., equipment-distributor firm with branches at Westbury, Long Island, and Union, N. J., announces the opening of a new branch in Philadelphia, Pa., this month. It is located on Roosevelt Highway, Route 1, near Byberry Road, Philadelphia, and serves the Philadelphia area; New-castle County, Del.; and southern New Jersey. Ehrbar handles Adams motor graders; Barber-Greene equipment; Chain-Belt equipment; Hough Payloaders; International diesel tractors, bulldozers, scrapers, and winches; and Thew-Lorain shovels and cranes. In the Philadelphia area covered by Ehrbar's new branch, the firm handles the exclusive sales and servicing of Hough Payloaders.

Midway Tool Co. Appoints Four

The Midway Tool Co., Inc., Melvin, Ohio, manufacturer of auger bits, has appointed four new distributors to handle its complete line of standard wood auger bits, electrician's bits, car bits, ship augers, electric drill bits, and screwdriver bits. The new distributors are:

H. H. Hobelman Co., 390 Bayshore Blvd., San Francisco, Calif., for California and Nevada.

A. L. Kiesler, 3 Park Place, New York, N. Y., for Metropolitan New York and upper New Jersey.

S & S Sales Co., 4229 Lovers' Lane, Dallas, Texas, for Texas, Oklahoma, Louisiana, and Arkansas.

Milo, Inc., 712 N. 16th St., Philadelphia, Pa., for lower New Jersey, Pennsylvania, Maryland, Delaware, and Virginia.

Ohio Distributor Opens New Office

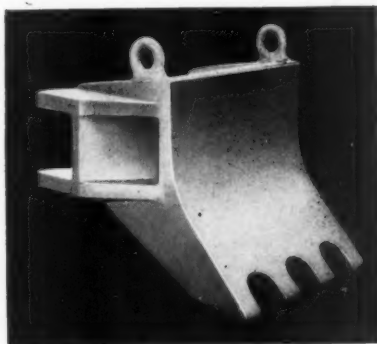
Central Ohio Tractor Co., Columbus, Ohio, recently opened a new branch in Cincinnati. Located at Dane and Ellis Streets, it carries a complete stock of parts and is fully equipped for overhauls.

Leo G. Koelker, Diesel Sales Engi-
(Continued on next page)



Central Ohio Tractor Co.'s new office in Cincinnati, Ohio. The insert shows its Manager, Leo G. Koelker.

DETACHABLE STUMPER



The FLECO Detachable Stumper is the answer for quick, economical and thorough tree and stump removal. It's tough and concentrates the full tractor power where needed.

An excessive amount of dirt is not removed to cause loss of tractor power and an oversize hole that would require additional time and use of machinery to fill. When using the Detachable Stumper the size of the hole is the same as the root system of the tree or stump.

Easily interchangeable with angling type bulldozers and fits snugly at the nose of the "C" frame after the moldboard has been removed.



ROOT RAKE
ROCK RAKE

BRUSH RAKE
DETACHABLE STUMPER

TREE CUTTER
TREEDOZER

Distributed by FLECO — "Caterpillar" Dealers All Over The World

FLECO CORPORATION

JACKSONVILLE 3, FLORIDA, U. S. A.



**TWIN
PRIME
PUMPS**

... Better
performance
... Lower cost

DUAL VOLUMES, fast priming, non-clogging portable, long lasting centrifugal pumps. Distributors—write for attractive proposition.

Write for circular
OHLER MACHINERY CO.
WATERLOO 3 IOWA

Distributor Doings

(Continued from preceding page)

neer, is Manager of the Cincinnati branch, which gives increased facilities for the sale and service of General Motors diesel engines. Parts and Service Manager is Charles Eiselein; and Joseph Marketti and James Rackham are assistants.

Ernest F. Higginbotham Dies

Ernest F. Higginbotham, President of Road Builders Equipment Co., Memphis, Tenn., died on March 31, after a short illness, at the age of 52.

Mr. Higginbotham, whose firm handles the distribution of Heil and other construction equipment, was also Vice President of Memphis Equipment Co. and President of Tractors & Equipment Co. of Paris, Tenn.

Allis-Chalmers Appoints Two

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed two new distributors, as follows:

West Virginia: The West Virginia Electric Corp., 208 Newton St., Fairmont, for the counties of Marion, Monongalia, Harrison, and Preston. M. A. McEntire is President of the company and H. F. Sargent is Sales Manager. West Virginia Electric will handle Allis-Chalmers motors, controls, pumps, transformers, and Texrope drive equipment.

Missouri: The Kahn Electric Motor Service, 1024 Charlieville Place, St. Louis, for the city of St. Louis and the counties of St. Louis, Jefferson, Washington, St. Charles, Ste. Genevieve, St. Francois, Madison, Iron, Crawford, Franklin, Gasconade, Montgomery, Audrain, Lincoln, and Callaway. Jacob Kahn owns the firm, which will distribute Allis-Chalmers motors and controls.

Bouchard Represents Republic

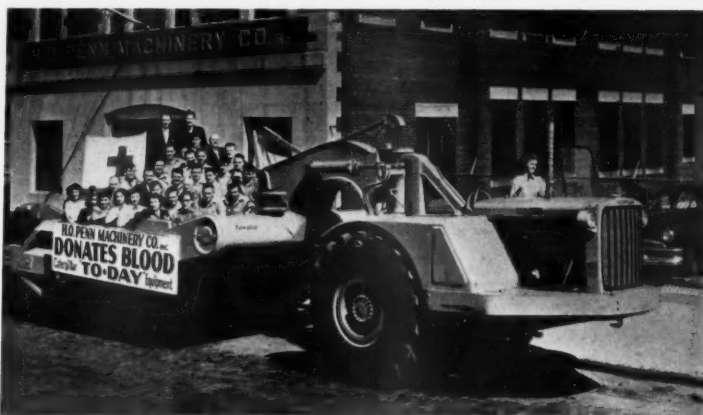
The John Bouchard & Sons Co., 1024 Harrison St., Nashville, Tenn., is distributor in the Tennessee district for Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, Ohio. Bouchard will carry a representative stock of Republic's industrial rubber products.

New Three-Color Dealer Display

Termite Drills, Inc., Pasadena, Calif., manufacturer of Termite rotary masonry drills, has developed a new dealer display. Printed in three colors, it is 12 inches square, is made of durable Masonite, and is mounted on a colorful 4 x 12-inch wooden base. Concrete and core drills are shown, and there is room on the display for 10 actual Termite drills in sizes from 1/4 to 3/8 inch.



Termite's dealer display is printed in three colors on 12-inch-square Masonite mounted on a wooden base. Ten actual drills are shown.



After giving blood to the Red Cross in response to Caterpillar's distributor-donation appeal, H. O. Penn employees get into a DW21 for the cameraman.

H. O. Penn Group Donates Blood

Thirty-seven employees of H. O. Penn Machinery Co., Inc., New York, N. Y., responded to the blood-donation

movement organized by Caterpillar Tractor Co., Peoria, Ill., among all its distributors. On April 18, H. O. Penn's Sales, Service, and Parts-Department

employees assembled at the Red Cross Center at St. Barnabas Hospital, Bronx, N. Y., and made their donation. The accompanying picture shows the whole group posed in a Caterpillar DW21 scraper in front of H. O. Penn's New York headquarters.

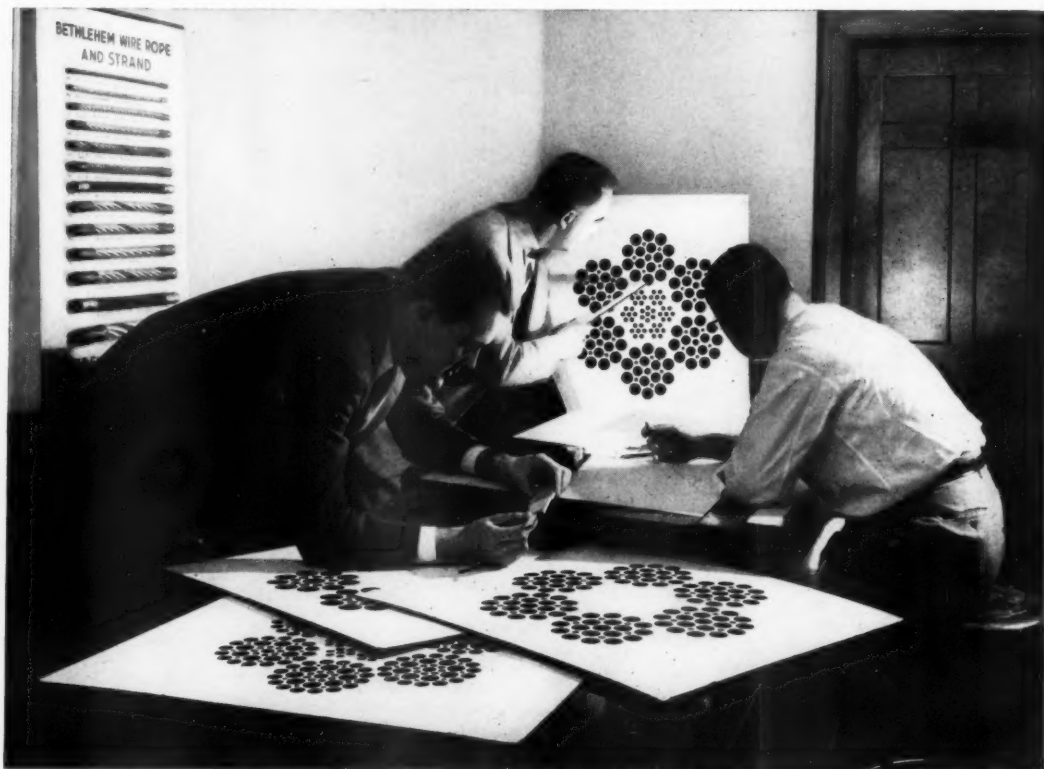
Four Distributors for Warco

W. A. Riddell Corp., Bucyrus, Ohio, has appointed four new distributors to handle Warco Models 4D-76 and 4D-100 heavy-duty motor graders, and Hercules road rollers. They are:

Northfield Iron Co., Northfield, Minn., for Minnesota and three Wisconsin counties. R. D. Brown is President of the firm, which has service representatives in Minnesota, Wisconsin, North Dakota, and South Dakota.

Ferro-Craft Engineering Co., Montgomery, Ala., for Alabama. The firm has recently established an Equipment Division which will handle Warco. R. P. Ownes is Manager of the Division and Rex Edwards is Sales Manager.

(Continued on next page)



Much of the durability of Bethlehem wire rope can be traced back to the engineer and the drawing-board.

So that your Wire Rope will serve you well

These engineers are engaged in a typical discussion of the product they live with—Bethlehem wire rope. They know the tremendous importance of good design, good engineering . . . and they will spend many hours, sometimes days, over a seemingly small point that they feel will improve the quality of Bethlehem rope.

The making of wire rope is more than a matter of drawing wire and laying wires and strands into intricate patterns. Wire rope starts in the minds of engineers, and at Bethlehem these minds are busy ones. When you rig with Bethlehem rope, you can be sure

that the rope has been well designed, well engineered . . . and that every subsequent step has received the same degree of care.

This care pays off on the job, where Bethlehem rope will serve you well. You can depend upon every foot, every inch of it, no matter how tough the going.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

When you think WIRE ROPE

... think BETHLEHEM



Distributor Doings

(Continued from preceding page)

Lund Machinery Co., Salt Lake City, Utah, for the entire state of Utah and parts of Idaho and Wyoming. Joseph M. McRae is President and General Manager.

Vern Wheeler Equipment Co., Inc., Jacksonville, Fla., for northern Florida and Southern Georgia. Vern Wheeler is President of the company and Melvin Colegrove is in charge of parts and service.

St. Louis Distributor Dies

Francis P. Gary, partner in the engineering and equipment-distributor firm of L. V. Fraley & F. P. Gary, St. Louis, Mo., died on March 16 at the age of 63. He went to St. Louis in 1933 and joined L. V. Fraley in forming the company, which distributes construction and mining equipment throughout the St. Louis district.

Distributors, Inc., Moves House

Distributors, Inc., Green Bay, Wis., has changed its address and is now located at 1672 Morrow St., Green Bay. Thomas Nolan is the newly appointed Sales Manager for the Waco Division of Distributors, Inc., and will handle sales of Waco sectional steel scaffolding, hoisting towers, portable elevators, scaffold and mason T-jacks, and other scaffolding equipment manufactured by Wilson-Albrecht Co., Inc.

Far Eastern Distributor's Visit

J. W. R. Marten, traveling representative of Muller & Phipps, Ltd., Far Eastern distributor for Universal Motors, Oshkosh, Wis., recently paid a visit to the United States. Mr. Marten's territory includes India, Pakistan, Burma, Indonesia, and the Malay States. On his visit to Universal Motors, he discussed plans for expanding the distribution and sale of Universal electric plants in the Far East. In spite of the unrest in these countries, Mr. Marten is optimistic about the future.

Redner Is Engine Sales Manager

Stephens-Jones, Inc., Des Moines, Iowa, distributor of construction equipment, has appointed R. D. Redner as Diesel Engine Sales Manager. Mr. Redner was formerly Sales Representative of the Detroit Diesel Engine Division of General Motors in the Iowa territory and will continue his association with the GM diesel, as Stephens-Jones represents Detroit Diesel in Iowa and several counties in Nebraska.

To Trade With India

A new company known as the Philips-Palit Corp., 100 E. 42nd St., New York, N. Y., will engage in foreign trade between the United States and India. It will concentrate on supplying India with heavy-construction machinery, dump trucks, machinery and equipment for power projects, electronic equipment and equipment for chemical and oil engineering. It will also represent a leading firm of



Rocky Mountain Machinery Co.'s building is at 1485 S. Second West St., Salt Lake City, Utah. The firm has taken over the distributorship of LeTourneau equipment in Utah and in parts of Wyoming and Idaho.

power engineers and a top firm of chemical engineering consultants.

Founders are Arie Vernes, President of Philips Export Corp., and A. R. Palit, formerly head of the India Supply Mission in Washington. In India the company will operate through A. R. Palit & Co., Ltd., with offices in Bombay, Calcutta, New Delhi, and Madras, taking over all activities of the existing A. R. Palit Co.

Rocky Mountain Handles LeTourneau

Rocky Mountain Machinery Co., 1485 S. Second West St., Salt Lake City, Utah, has been appointed by R. G. LeTourneau, Inc., manufacturer of heavy-construction and lifting equipment, as its distributor in the entire state of Utah, 3 counties in Wyoming, and 13 counties in Idaho.

Rocky Mountain is a new distributor-



L. W. Gurr is President of Rocky Mountain Machinery Co.

ship which has recently taken over the J. K. Wheeler Machinery Co.'s building and operations. The company's President

(Concluded on next page, col. 3)

McKIERNAN-TERRY PILE HAMMER

drives 304-ft steel pile

**Sets record for
Long Pile Driving on
Meadville, Pennsylvania
relocation job**

"We put this 14-in. H pile down 304.3 ft with a McKiernan-Terry S-8 Single-Acting Pile Hammer." That's the statement of L. A. Meyer, superintendent for S. J. Groves & Sons, contractor on this Meadville, Pa. bridge relocation job.

Naturally a powerful McKiernan-Terry Hammer set this impressive pile driving record. With a 26,000 foot-pound blow, the McKiernan-Terry S-8 successfully met varying ground conditions. Piles about 50 ft apart encountered both light and heavy resistance to penetration. Lengths averaged 170 ft with differences of as much as 100 ft between piles next to each other.

On record-making or regular jobs, McKiernan-Terry Hammers always insure profitable pile driving. Complete McKiernan-Terry line includes 16 sizes of hammers and 2 sizes of extractors. Write for bulletin giving full details.

A McKiernan-Terry S-8 Single-Acting Pile Hammer driving long-length steel piles for relocation work on a five-span bridge near Meadville, Pa.



L. A. Meyer, contractor's superintendent, standing alongside the record-depth pile driven by McKiernan-Terry Hammer.

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MEAD-MORRISON COAL AND ORE UNLOADERS AND BRIDGES
Available in a variety of designs and in capacities of 300 to 1500 tons per hour. Exceptional durability proven by installations in service for half a century. Simple controls afford convenient, comfortable and speedy operation.



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Range of types and sizes take bulk materials loads up to 25 tons. Ruggedness without excess weight.



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BeeLine 100-TON Jack
WITH Remote Control

for heavy-duty jobs!

8" Base Diameter 19-1/8" Extended Height
13-3/8" Collapsed Height 144 lb-Weight of Ram

BeeLine co.
SAVINGPORT, IOWA U.S.A.

G. L. Lindsay Dies

George Lee Lindsay, Director of Tests and Research, Universal Atlas Cement Co., New York, N. Y., a subsidiary of United States Steel, died on April 24, following an operation. He was 55 years of age. Mr. Lindsay had

been associated with Universal Atlas since 1921 and took a major part in the company's research program.

F. P. Diener succeeds Mr. Lindsay as Director of Tests and Research. He joined Universal Atlas in 1924 and in 1943 became Chemical Engineer for the company.

On this construction job a fleet of Prime-Movers carry the load. They're at it all day long dumping 10 cu. ft. a trip. The manpower saving alone soon pays for the investment. Bucket returns to load position automatically. Powered forward and reverse.



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cause it's a good idea . . . a paying ideal! A large platform can be quickly mounted in place of the bucket. Dependable 5 H.P. Wisconsin engine powers the unit forward and reverse—and up steep grades. Nationwide sales and service by leading distributors. Write to us for helpful information and distributor's name in your locality. We will arrange a demonstration for you.

Any Way You Add It Up—Prime-Mover Multiplies Manpower!



THE PRIME-MOVER CO., Muscatine, Iowa



Distributor Doings

(Continued from preceding page)

dent is L. W. Gurr, former Secretary-Treasurer and Service Manager of J. K. Wheeler. Other executives are Leland Knudsen, Vice President, and Reg Grane, Parts Manager. Don Miller and Frank Barbes are service men.

Dyke & Tutsch for Cleaver-Brooks

Dyke & Tutsch Co., 3253 N. Green Bay Ave., Milwaukee 12, Wis., is a newly appointed distributor for Cleaver-Brooks Co., Milwaukee manufacturer of boiler and heat-generating equipment. Its territory comprises 9 counties in southeastern Wisconsin including Milwaukee, Racine, Kenosha, and Waukesha Counties. The recently formed partnership consists of R. J. Tutsch, formerly Sales Manager of the Boiler Division of Cleaver-Brooks, and T. P. Dyke, former City Sales Engineer of that Division.

A Crawler Must Have Shoes to Fit the Job

If your shoes are too big, you drag your feet—and so does a crawler. E. A. Braker, Supervisor of International Harvester Co.'s Industrial Power Sales Engineering Department, attaches great importance to fitting a crawler tractor with the correct track-shoe size for the job it has to perform. Don't "overshoe" your tractor, he says. Track shoes that are too wide for job conditions cut down the track life, maneuverability, and speed of your crawler. Never mind about the make of tractor; it's the operating conditions that matter when you are selecting track shoes. These conditions involve (1) flotation; (2) pull-bracing grouser area; and (3) track-wear life.

Ground pressure is usually the measure of flotation. To determine ground pressure, the easiest way is to divide the tractor's weight in pounds by the number of square inches of track area resting on the ground. How do you figure the track area on the ground? Double the track-shoe width and multiply that figure by the distance in inches between the center lines of the drive sprocket and the front idler.

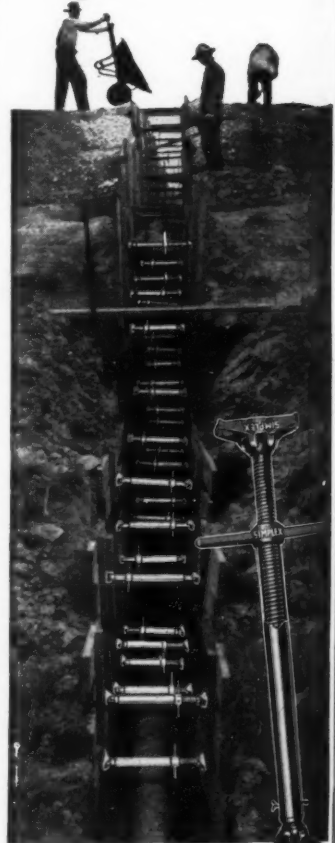
The "pull-bracing grouser area" is the next factor to be examined, says Mr. Braker. Sometimes such wide shoes are used that the weight of the tractor isn't enough to push the grousers into the ground to their full depth. This cuts down the area of the grousers which actually do penetrate the ground and help pull the tractor along (the pull-bracing grouser area); rolling resistance is increased; and track wear becomes greater because unnecessary leverage loads are imposed. Consider, too, the wear and tear on the drive train of a tractor whose shoes are too wide: when the tracks will not slip under overloads in first gear, the drive train takes a lot of punishment from shock loads; on the other hand, if the shoes slip in first gear, under heavy load, they prevent overloading and encourage the operator to take slightly smaller loads at higher speeds.

Mr. Braker's third factor involved in job conditions is that of track-wear

life. The ground underneath the track shoes must literally "turn with the tracks". A wide shoe increases twisting stress against pins and bushings, builds up greater leverage loads against roller flanges, and reduces tractor power on turns. When a very wide shoe travels over uneven or rocky terrain, a purely mechanical-wear effect can take place. The very wide shoe offers a large area of "no contact" on rough ground and the leverage load imposed on the shoes by a moving tractor can be sufficient to bend them.

It will thus be seen, says Mr. Braker, that overshoeing a tractor can increase rolling resistance and shorten track life. There are, of course, many jobs where wide track shoes are both necessary and desirable. But as a general rule, advises Mr. Braker, use the recommended-width track shoes, and get the maximum horsepower you pay for. Results—less down time, longer track life, better maneuverability, faster time cycles, and more work done at less cost.

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AGAINST
CAVE-INS**



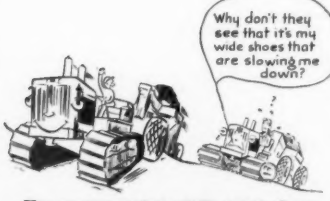
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Use recommended-width track shoes.

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

When Clerical Error in Bid Permits Bidder to Withdraw

THE PROBLEMS: Plaintiff, a public contractor, bid \$780,305 on a job involving a sewer-pipe system for Los Angeles. Each of the three higher bids exceeded \$1,000,000 each. Shortly after the bids were opened, but before an award was made, plaintiff discovered a mistake in his bid. In a necessarily hurried calculation of costs involving more than 1,000 items he had omitted to transfer to a final accumulation sheet a \$301,769 item appearing on one of three work sheets. The contracting board was immediately notified of the mistake and told that the bid was withdrawn; nevertheless it awarded the contract to plaintiff. Plaintiff sued to cancel the bid and discharge his bid bond.

(1) Was plaintiff entitled to relief from his bid? (2) If there was an innocent mistake in preparing the bid could it be regarded as such "neglect of legal duty" as would deprive plaintiff, under a California statute, of right to withdraw the bid? (3) Did it make any difference that the invitation to bidders specified that they would "not be released on account of errors"? (4) A city charter existed, providing that bids could not be withdrawn after being opened. Did this apply?

THE ANSWERS: (1) Yes. (2-4) No. (M. F. Kemper Construction Co. v. City of Los Angeles, 235 Pac. 2d 7, decided by the California Supreme Court, August 28, 1951.)

The decision in this case is of considerable importance, not only because rendered by a court of high authority, but because it is fortified by references to decisions rendered by other high courts, including the United States Supreme Court.

1. The California court recognized that a bid for public work gives the public authority an irrevocable option when the bid is opened and declared, unless it is proved that there is good ground for recalling the bid. Mutual mistake of the parties is one ground for cancellation, and the court said that there is an "equivalent to mutual mistake" when one submitting a proposal commits an honest mistake of such nature that the other party should realize that a mistake has occurred. The court cited in support of this rule of law decisions of the United States Supreme Court and of appellate courts in New York, New Jersey, Connecticut, Illinois, and Nebraska. It also cited an extended article on the subject, where the writer discussed the effect of a "palpable mistake" in a bid. (16 Minn. Law Rev. 143-145.)

2. Applying certain California statutes, which merely codify what many courts in other states have declared to be law in the absence of statute, the Supreme Court said, in substance: A bid or contract can be rescinded for a mistake of a material fact, where the mistake was not the result of a neglect of legal duty; if it would be unconscionable to permit the other party to take advantage of the mistake; and if the latter is not prejudiced by cancellation of the bid or contract beyond losing the advantage that the mistake gave him. "Neglect of legal duty", resulting in a mistake such as to deprive a bidder of right to withdraw, means culpable negligence, and the courts in different states have often decided that a mistake like that here involved is not culpable. "The type of error here involved is one which will sometimes occur in the conduct of reasonable and cautious businessmen." Defendant city was informed of the

mistake in ample time to avoid necessity for readvertising for bids, and actually awarded the contract to the next-lowest bidder. It had no right to insist upon "the benefit of an inequitable bargain".

3. Rejecting the city's contention that plaintiff was bound by the clause in the bidding specifications that bidders would "not be released on account of errors", the Supreme Court noted that "there is a difference between mere mechanical or clerical errors made in tabulating or transcribing figures" on the one hand, "and errors of judgment, as, for example, underestimating the cost of materials", on the other. The distinction is recognized when right to

rescind is asserted, "and in the procedures provided by the state and Federal governments for relieving contractors from mistakes in bids on public work".

4. The city also relied on a charter clause: "After bids have been opened and declared, except with the consent of the officer, board, or city council having jurisdiction over the bidding, no bid shall be withdrawn." Deciding that

the clause should not be applied in a case like this, the court quoted what the United States Supreme Court said in the case of Moffett, Hodgkins & Clarke Co. v. City of Rochester, N. Y. (178 U. S. 376, 20 S. Ct. 957, 44 L. Ed. 1108) in rejecting defendant city's argument: "If the city is correct in its contention, there is absolutely no redress for a bidder for public work, no matter

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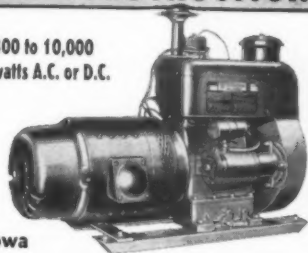
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Avoid Legal Pitfalls

(Continued from preceding page)

how aggravated or palpable his blunder. The moment his proposal is opened by the executive board he is held as in a grasp of steel. There is no remedy, no escape. If, through an error of his clerk, he has agreed to do work worth \$1,000,000 for \$10, he must be held to the strict letter of his contract, while equity stands by with folded hands and sees him driven into bankruptcy. The city's position admits of no compromise, no exception, no middle ground." The California court noted that in many other cases decided by other courts similar charter clauses have been held not to preclude withdrawal of bids in situations like those involved in this case.

As regards a statutory provision for

forfeiture of bid bonds for failing to enter into a contract, the court decided that it did not apply.

One of the six judges of the Supreme Court who heard the case on appeal dissented, being of the opinion that the bid was not withdrawable in face of the clause in the bidding specifications and of the statutory provision.

Underground Water Flow: Liability for Interference

THE PROBLEM: A damage suit was brought against a dredging and construction company. The complaint charged that, in constructing a yacht basin and landing field, defendant negligently diverted underground water flow from springs on plaintiff's adjacent land; and that the diversion was rendered permanent after defendant knew that the interference with flow would result. Did the complaint state facts making plaintiff liable?

THE ANSWER: Yes. (Labruzzo v. Atlantic Dredging & Construction Co., 54 S. 2d 673, decided by the Florida Supreme Court.)

The court noted first that excavation does not generally render the owner liable for interference with underground water supply unless there is either an intentional and unreasonable interference, or an unintentional but negligent, reckless, or ultrahazardous interference.

It decided that the complaint failed to state liability in so far as it relied upon an unintentional but negligent interference, because no facts showing negligence were alleged. Though defendant may have known that water-bearing strata underlay the area, that fact alone did not warn him that excavation would obstruct water flowing to plaintiff's spring.

But the court ruled that the complaint did state a right to collect damages on these grounds: it alleged, in substance, that after defendant had unintentionally interfered with the underground channel, but before the flow had been permanently diverted, defendant discovered that the channel did lead to plaintiff's spring. In spite of this, defendant proceeded with the excavation. If true, the allegations showed "an intentional invasion by defendant of their water rights, for which it must respond in damages if its conduct was unreasonable under the particular circumstances."

The court referred to its decision in an earlier case, where a landowner complained that defendant's construction of a dam obstructed subsurface flow, to plaintiff's injury. There it was decided that the essential question was whether defendant made reasonable use of his land. In that case the court said: "The property rights relative to the passage of waters that naturally percolate through the land of one owner to and through the land of another owner are correlative; and each landowner is restricted to a reasonable use of his property as it affects subsurface waters." (Cason v. Florida Power Co., 76 So. 535.)

The opinion in the later case seems to have been strongly influenced by one rendered by the Pennsylvania Supreme Court in the case of Zimmerman v. Union Paving Co., 6 Atl. 2d 901. In that case, the paving company, on starting to excavate a borrow pit near a spring, found that water was seeping through the side of the pit. Plaintiff, who piped water from the spring under gravity pressure, warned the company as to his rights. But the company went ahead, with consequent damage to plaintiff, and was declared by the Pennsylvania court to have rendered itself liable. The judges reasoned that ordinarily an excavator is not liable for injury to an adjacent landowner's water rights, where he does not act maliciously or negligently, because "the subterranean sources of a spring are

not perceptible." But there is liability if the injury is plainly foreseeable and can be avoided by reasonable care and at reasonable expense. "Since, in the present case, defendant had ample warning of the likely result if the excavation was continued in the direction of the spring, it cannot, in the face of its willful action after such notice, claim immunity from responsibility merely because the water diverted was of subterranean origin."

State Engineer's Estimate Of Excavation Bound State

THE PROBLEM: A highway contractor signed a contract with state authorities on the faith of cross-section drawings showing about 38,000 cubic yards of rock excavation, and the state engineer's statement that no more was involved. In fact 70,000 yards were involved, and the contractor quit on the highway department, refusing to revise the price when he discovered the true

underground situation. The state sued on the contractor's bond and the contractor counterclaimed for the reasonable value of work done. Could the state avoid liability on the ground that it was not bound by the engineer's assurance as to the extent of rock involved?

THE ANSWER: No. (State v. Hartford Accident & Indemnity Co., 84 Atl. 2d 579, decided by the Connecticut Supreme Court of Errors.)

The court reasoned: Public officers must act within their statutory powers, and contractors dealing with them are bound to know just how much power and authority the officers have. But the engineer did not undertake to alter the contract plans and specifications. He merely confirmed what the cross-section drawings showed. His statements merely amounted to information to which any bidder was entitled, and were made to induce the contractor to sign the contract.

(Concluded on next page)

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Avoid Legal Pitfalls

(Continued from preceding page)

The court cited three decisions of the United States Supreme Court as supporting its conclusion that "the positive assertion that the drawings showed the amount of rock which would have to be cut . . . was a representation on which the company had a right to and did rely."

Equipment-Damage Notice Sufficient, Though Verbal

THE PROBLEM: A lease of heavy-construction equipment specified that the lessee should be liable for loss or damage not due to ordinary wear and tear, but that claim therefor should be void unless "made known" to the lessee within seven days after receipt of the equipment. The lessor verbally notified the lessee's job superintendent shortly before the equipment was returned that it was damaged and the superintendent agreed to have it repaired; but this was not done. Was the lessee released from liability, either because written notice was not given, or on a theory that notice to the superintendent was not notice to the lessee?

THE ANSWER: No. (Smith Contracting Corp. v. Trojan Construction Co., 192 Fed. 2d 234, decided by the United States Court of Appeals, Tenth Circuit.) Upholding a decision to the same effect by the United States District Court, Western District of Oklahoma (94 Fed. Supp. 655), the Court of Appeals said that requirement that a damage claim be "made known" does not require that it be in writing. Moreover, a superintendent in charge of a job on which leased equipment is used by his employer has implied authority to accept such notice as was required in this case.

Federal-Project Guards Not Contractor's Employees

THE PROBLEM: After a Federal cost-plus-fixed-fee contract had been made, the Government induced the contractor to engage guards. Later the Government substituted guards of its own selection. The contractor paid the guards, deducting social-security taxes. Was the contractor the guards' employer in such sense as to make him liable to them for overtime pay under the Fair Labor Standards Act?

THE ANSWER: No. (Fruco Construction Co. v. McClelland, 192 Fed. 2d 241, decided by the United States Court of Appeals, Eighth Circuit.)

The court reasoned that the guards were hired for the protection of Government property and not for the benefit of the contractor. And, because the guards were hired by the Government and subject to its control, the court distinguished the case from one where the United States Supreme Court had decided that safety employees in a cartridge factory were employees of a cartridge company. In that case the employees were hired, fired, and controlled by the company, and the prime contract stated that they were employees of the company.

Uses Zoned Area for Storage

THE PROBLEM: A zoning ordinance designated a marshy area as a residential district within which only single-family dwellings, churches, schools, libraries, and private clubs could be established. A contractor acquired land in the district that had been used for greenhouse and storage purposes. Water was available, but no sewers. The only houses nearby were of the

"blighted area" type. The city opposed his use of the land for storage of excavating and other heavy equipment, including trucks and bulldozers. Was the ordinance valid and enforceable against the contractor?

THE ANSWER: No. (Fenner v. City of Muskegon, 50 N. W. 2d 210, decided by the Michigan Supreme Court.)

The court said that the ordinance was void as being unreasonable, because the land was not suited to residential use.

Oral Modification Binding

THE PROBLEM: A written contract to construct a state road through a state forest preserve provided that the contractor could salvage removed timber. Later it was orally agreed with the district engineer that the State, through the Conservation Department, should have the salvaged logs and promptly remove them. Delay in their removal delayed the contractor. Was the oral modification binding on the State, and

was the State liable to the contractor for damages resulting from the delay?

THE ANSWER: Yes. (D'Angelo v. State

of New York, 106 N. Y. Supp. 2d 350, decided by the New York Court of Claims.)

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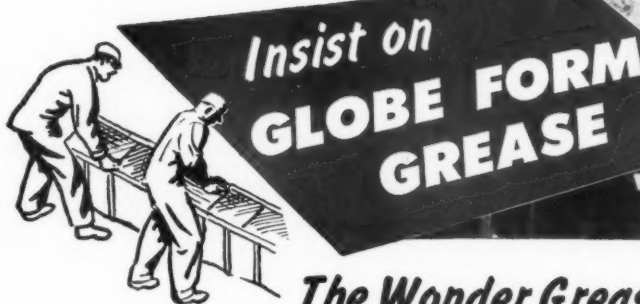
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City Improves Sewage And Water Facilities

Contract Includes a Disposal Plant, 25 Lift Stations, and Miles Of Sanitary-Sewer and Water-Main Pipe

• PANAMA CITY, Fla., will soon be enjoying the benefits of an improved sewer system and water facilities. The Gulf Coast city in western Florida is spending \$3,500,000 for the construction of a new sewage-treatment plant, 25 lift stations, and over 85 miles of assorted pipe for sanitary sewers and water mains. M. R. Boyce Co. of Clearwater, Fla., is contractor on the project, with Smith & Gillespie of Jacksonville, Fla., the consulting engineer. Work got under way in March, 1951, and is expected to be completed this August.

The area under improvement extends nearly 18 miles along the bay front, from St. Andrew on the west to Millville on the east, and inland for approximately $3\frac{1}{2}$ miles. The newer western end of the city already has sewage facilities and a treatment plant, but the older central and eastern sections have had none until now. Homes of white residents usually are equipped with septic tanks, while in the negro quarters there are pit privies. The new sewage system will cover the entire city which had a rapid growth during and after World War II.

Panama City gets its drinking water from wells. A new well is being driven to augment the existing one, while the new mains extend to all parts of the municipality. The water lines include both a transmission and distribution system. Larger-size pipe is being laid to replace the smaller mains, which are inadequate for the needs of the increased population which now totals over 25,000.

High Water Table

In this Gulf Coast region, ground water is encountered at a level only 3 feet below the surface, and wellpoint systems were employed constantly in the trenching operations so that the pipe might be laid in the dry. The sanitary-sewer system consists of 420,000 linear feet of terra-cotta pipe, ranging in size from 8 to 24-inch diameter. It was obtained from two sources—W. S. Dickey Co. of Birmingham, Ala., and Oconee Clay Products of Milledgeville, Ga. The pipe came in 2 to 5-foot lengths, and the joints were sealed in the trench with G-K compound. Force mains, totaling 10,000 linear feet, vary in two-inch increments from 4-inch diameter up to 18-inch diameter.

Average depth of trench was 8 to 10 feet, with the maximum cut around 16 feet. The soil is mostly sand or sand-clay, with occasional strata of hardpan and some gumbo. Excavating equipment for the trenches included a P&H $\frac{3}{4}$ -yard backhoe; a Buckeye Clipper $\frac{3}{4}$ -yard backhoe; a Link-Belt Speeder $\frac{3}{4}$ -yard dragline; and two Bantam truck cranes on GMC chassis. The last two rigs had 30-foot booms; one machine used a Williams $\frac{1}{2}$ -yard clamshell, while the other worked with a Hendrix $\frac{3}{4}$ -yard dragline bucket.

Griffin wellpoints were installed in the low flat areas where the water table was high. A typical installation consisted of $1\frac{1}{2}$ -inch-diameter risers, 17 feet long, placed on 6-foot centers in a row about 3 feet back from one side of the ditch. The risers connected to a 6-inch header line which was hooked to a Griffin 8-inch diesel-driven pump. As only short sections of trench were opened at a time, a total of 3,600 feet of header and two pump units took care of the job needs.

Lift Stations

Complete gravity flow in the sewer system was impossible with the flat terrain, so 25 lift stations were built to assist in moving the sewage to the disposal plant. The average station measured 13 x 26 feet with a foundation of reinforced concrete and a superstructure of masonry. The depths varied from 12 to 22 feet according to the lift. Wellpoints were used to dewater the sites before the start of excavation. In addition to the Griffin



C. & E. M. Photo

A P&H $\frac{3}{4}$ -yard backhoe excavates trench for 8-inch pipe on the Panama City project.

units, the contractor also used two Moretrench 8-inch electric-driven pumps and 800 feet of 6-inch headers with the risers. A pair of Marlow 4-inch pumps also saw service.

The new sewage-treatment plant, with a daily capacity of 3,000,000 gal-

lons, is located on an island in Watson Bayou near the east end of the city. This island had a top elevation of 23 which was graded down to 15 with a tractor and scraper. The surplus material was used to enlarge the area of the

(Concluded on next page)

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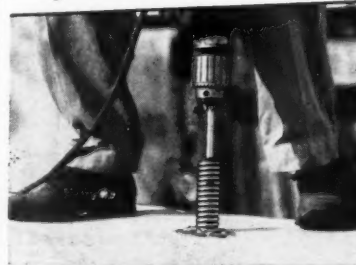


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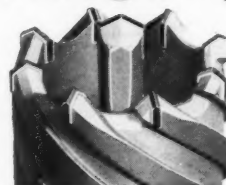
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island, and to build a causeway out from the mainland. Two 48-inch culvert pipes were built into the causeway fill to insure constant circulation of water around the plant site.

Designed to serve a population of 35,000, the plant consists of two primary clarifiers, two secondary clarifiers, and two digesters—all with 60-foot diameters—and two trickling filters with 85-foot diameters. The sludge bed measures 50 x 242 feet. The inside surfaces of the concrete walls at the plant and lift stations were painted with Inertol, a waterproofing material. Membrane waterproofing was used on the outside walls of the lift stations.

Water Mains

From the deep wells the water for Panama City is pumped up into three elevated tanks, and from there distributed throughout the city. All the water mains are cast-iron pipe supplied by the U. S. Pipe & Foundry of Birmingham, Ala. The new distribution system consists of 7,000 linear feet of 12-inch-



C. & E. M. Photo

Terra-cotta 8-inch pipe goes into a 2 to 4-foot cut. At left is a Griffin 8-inch diesel pump on a 6-inch header, with 1½-inch risers on 6-foot centers along one side of the ditch, 3 feet from the edge.

diameter pipe, and 14,000 linear feet of 10-inch-diameter pipe. At one location where the line passes under a bayou, 700 linear feet of 10-inch water line with ball-and-socket joint connections was used.

For the land work the pipe came in 18-foot lengths, and the joints were poured with lead. In the deeper trenches slides were avoided by stringing vertical 2 x 8's along both sides on 6-foot centers. Pollard trench jacks were braced between the sections of sheeting.

Two Caterpillar tractor-dozers—a D4 and a D2—were used for backfilling the trenches. An International TD-18 tractor, equipped with a boom, lifted out the wellpoints and placed them on a flat-bed truck for moving about the job. Because of the large area covered by the project, a good-size fleet of trucks was required to move materials. Trucks included 13 flat-beds, of which 9 were Chevrolets and 4 were Studebakers, and 5 pickups—2 Studebakers, a Chevrolet, a Dodge, and a Ford.

Personnel

The contractor has employed from 125 to 200 men on the sewer and water project. Four crews were kept busy laying the terra-cotta sewage pipe, while two crews handled the cast-iron water mains. At the same time another crew was on the treatment plant, two crews were building the lift stations, and a crew looked after the wellpoint installations. Large pieces of equipment were moved on a low-bed trailer.

The Boyce Co. is represented on the Panama City project by Malcolm A. Moye, Jr., General Superintendent.

For Smith & Gillespie, consultant, A. J. Birchall is Project Engineer, and J. E. Lamm is Chief Inspector.

Karl R. Gray is Mayor of Panama City, and Charles Peterson is City Engineer.

Sonoco's New Sales Division

Construction Products Division is the name of a newly formed section in the Sales Department of Sonoco Products Co., Hartsville, S. C. The division will handle the sale of Sonoairduct and Sonotube exclusively and will also handle the sale of any other products which may be developed for the building and construction industry.

A sales office in Montclair, N. J., takes care of the eastern territory for this division, comprising the District of Columbia, Maryland, Delaware, Pennsylvania, New Jersey, New York, and the New England states. J. A. Durkin is in charge of the Montclair office. The remainder of the United States territory is served from the Hartsville office, where E. S. Reid is in charge.

Allen Joins Wall Colmonoy

Anthony J. Allen comes to Wall Colmonoy Corp., Detroit, Mich., manufacturer of hard-facing materials, as Eastern Sales Manager. He will make his headquarters in New York. Mr. Allen is thoroughly familiar with the

hard-facing industry, in which he has spent some time as sales engineer and sales manager.

Death of Allston Dana

Allston Dana, designer of the George Washington, Triborough, and White-stone Bridges, died on May 12 at the age of 67. An eminent engineer, he had a further claim to fame in that his maternal grandfather was Henry Wadsworth Longfellow.

As Engineer of Design for the Port of New York Authority, Mr. Dana played a large part in the building of the George Washington Bridge and the three Staten Island spans, the Goethals Bridge, the Outerbridge Crossing, and the Bayonne Bridge. Acting in the same capacity for the Triborough Bridge and Tunnel Authority, he designed the Triborough Bridge and the Bronx-Whitestone span. He had recently been designing bridges for the Pennsylvania Turnpike.

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This Unit will produce steam in two minutes from a cold start and gives steam only when steam is needed. No experienced operator is needed on the job hours ahead to get up steam, saving hours of labor. Burning low-cost fuel-oil, the "Kwik-Steam" Generator saves up to 50% on fuel. "Kwik-Steam" Generator meets every need for Pile Driving or Pile Extraction will operate any make of hammer. Made in sizes from 20 to 165 BHP. Can be had with electric motor or gasoline engine. Write for Pile Driving Bulletin.



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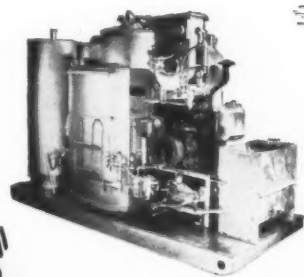
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The 17 1/2-ton Power Twin hydraulic ram and its new big brother, the 30-ton.

New Hydraulic Ram

A 30-ton Power-Twin hydraulic ram is announced by Owatonna Tool Co., 381 Cedar St., Owatonna, Minn. It is similar in design and has the same features as the 17 1/2-ton ram, but with almost twice the power.

It weighs 23 pounds and has center-

hole construction. It works in any position, is fully adjustable, eliminates torque, and takes the hard work out of pulling and installing operations, the company says. It is 6 3/4 inches high, 7 1/2 inches wide, 3 inches thick, and has a 2 1/2-inch ram travel.

Both the 17 1/2 and 30-ton rams work off the same-size pump, which operates by remote control to insure safety. Complete sets of attachments are available for use on industrial tractors, earth-moving equipment, and pulling and installing operations.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 121.

Air-Line Cleaner

A catalog on a mechanical cleaner for compressed-gas and air lines is available from Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill. When compressed air moves through the Aridifier it revolves 4 rotors at high speed. Heavier solids and foreign

materials are thrown to the side walls, drop to the base, and flow by gravity to an accumulator or trap.

When the air stream moves through one rotor into the one immediately above it, the reverse pitch of the upper rotor vanes causes the air to change direction violently and throws the foreign matter to the side. This action is followed by a further cleaning in the series of scrubbing rings in the head.

This literature may be obtained from the company by requesting Catalog 252, or by using the Request Card at page 16. Circle No. 184.

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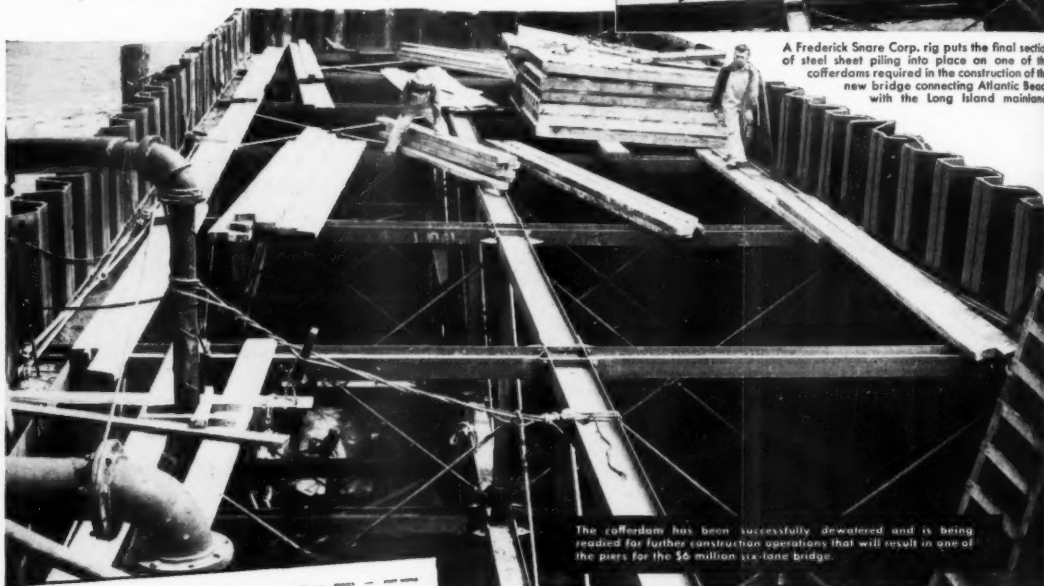
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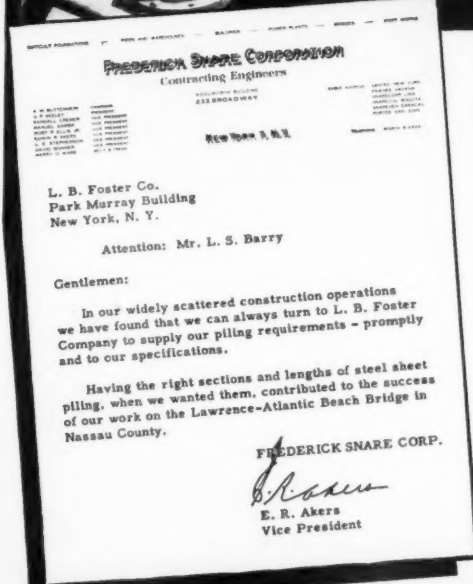
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Says: **FREDERICK SNARE CORP., New York, N. Y.**



A Frederick Snare Corp. rig puts the final section of steel sheet piling into place on one of the cofferdams required in the construction of the new bridge connecting Atlantic Beach with the Long Island mainland.

The cofferdam has been successfully dewatered and is being readied for further construction operations that will result in one of the piers for the \$6 million six-lane bridge.



On a complex and difficult job—the contractor knew he needed the exact lengths and exact sections of steel sheet piling to accomplish the job economically. Frederick Snare Corporation needed, promptly, a quantity of 60 ft. lengths of ZP-27 sections for construction of a cofferdam used in the pier construction of the new Lawrence-Atlantic Beach Bridge, Nassau County, New York. They turned to the one largest, most reliable source—L. B. Foster Company, and got exactly what was needed to complete the job on time.

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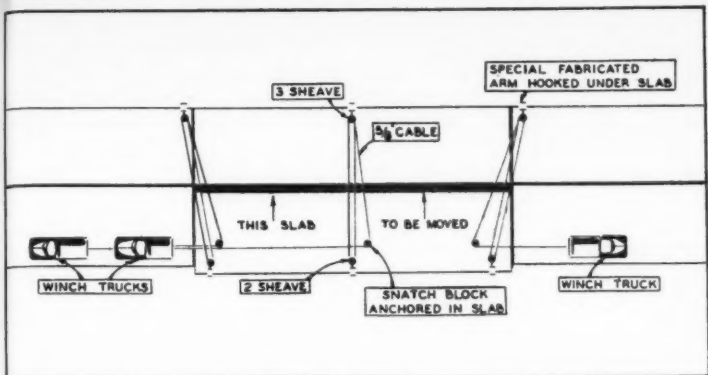


Diagram Courtesy of Connecticut State Highway Department

Connecticut's slab-righting equipment is shown here in position, ready to start the pull which will move the slab back to the center line.

Cure for Sideways Slip in Pavements

John Tochko, head of the Connecticut State Highway Department's mud-pumping crew, has devised a way to restore concrete pavement slabs that have slipped sideways as well as vertically. Mr. Tochko and his crew put the plan into practice on Route 9 in the town of Haddam, Conn., where some 60-ton slabs had slipped away from the center line.

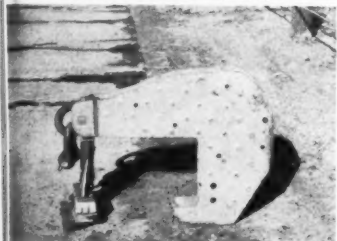
The first step in the procedure was to jack up the pavement slabs to within one inch of the original grade; next, the men freed the slab on three sides and made sure that the adjoining transverse joints as well as the longitudinal joint were clear of any material that might have accumulated in them. Then the heavy moving equipment came into play. This consisted of three 6½-ton winch trucks with ⅝-inch cable; three sets of three and two 12-inch sheave

blocks; three sets of 12-inch snatch blocks; three sets of heavy steel hooks; and three sets of 2½-inch steel pins with welded braces.

Mr. Tochko's crew placed one hook about 18 inches from the end of the slab and the other hook across the pavement on the adjoining slab about 18 inches from the end. This created a slight diagonal pull against two blocks. The same installation was used at the other end of the slab. A third set of hooks was placed midway of the slab, at which location the pull was straight across the pavement (see accompanying drawing).

The last stage of the operation, the whole of which took less than 5 minutes, was to place one truck about 100 feet from one end of the slab and the other two trucks at the opposite end of the slab about 100 and 150 feet away. The slack was then taken up on all three sets of hooks, pulling the cable to a slight strain. When the strain was equal on all three pulling lines, the foreman signaled for all three trucks to begin pulling together. This caused the slab to move laterally back to its original position.

The Connecticut State Highway Department has also done some experimental installing of ties to keep slabs from separating at the longitudinal joint. Such separation occurs only on pavements which were laid before it was customary to provide longitudinal ties. Mr. Tochko devised experimental brackets which were installed on the outside edge of the pavement directly across from each other, 10 feet apart and bolted to the concrete with a bolt



Connecticut State Highway Dept. Photo

Closeup of one of the heavy steel hooks used to adjust a pavement slab that had slipped away from the center line on Route 9, in Haddam, Conn.

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- ★ Twin helix—no back thrust!
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THE PENGU CUTTING HEAD

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Connecticut State Highway Dept. Photo

This picture shows a set of two hooks at one end of the slab. In simultaneous action (but not shown) are two other sets—one at the other end, one in the center of the slab.

embedded in lead wool. The tie material used under the pavement is standard fence cable and fittings, which makes the tie bracket the only special

equipment required. These ties were installed on the Haddam job and it is anticipated that they will prevent any further slippage.



Heltzel ON THE JOB ON THE PENNSYLVANIA TURNPIKE

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Type E-2*—Capacities: 300 and 400 bbls.

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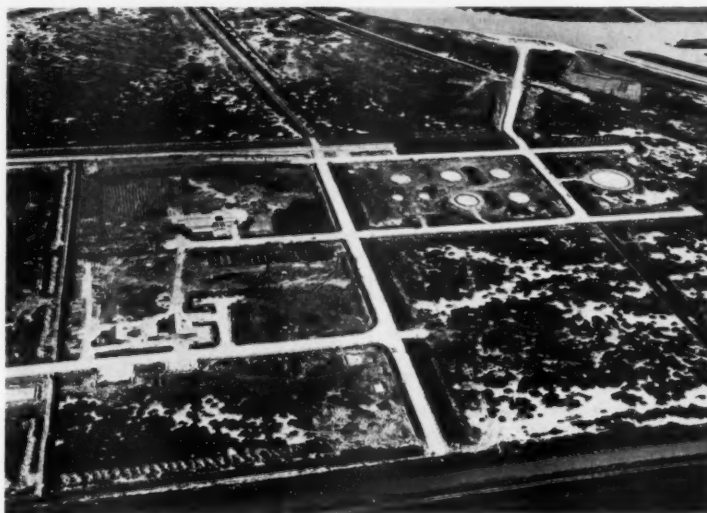
WARREN, OHIO



Uses Creosoted Piles For Concrete Economy

Centuries ago, people who lived on the shores of the Swiss lakes found that the poles supporting their huts decayed above the surface of the water but not below it. Every now and again antiquarians still find solid remnants of these foundations, which goes to prove that untreated-wood piles will last indefinitely if totally submerged in fresh water to cut off the air essential to wood decay.

This is all very well for foundations where the water and land levels are the same. But the use of untreated-wood piles to support modern land construction would become very costly where extensive excavation is necessary to reach the water table and a large volume of concrete is then required to build the foundation back up to ground level. For this reason the use of pressure-creosoted piles is standard practice in most places. On account of their resistance to decay, they can



An aerial view of Koppers Co.'s new ethylbenzene plant on marshy ground near Port Arthur, Texas. The plant proper is at the left, and the concrete pads on top of the piling can be seen at the right.

be cut off at any point above the water table, and the thickness of the concrete is correspondingly reduced.

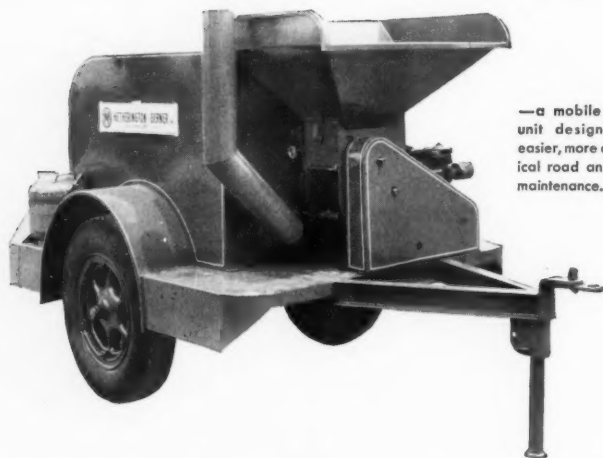
The use of these piles saved Koppers Co., Inc., Pittsburgh, Pa., more than \$33,000 in the construction of a multi-million-dollar ethylbenzene plant for its Chemical Division on the marshy flatlands of the Texas gulf coast near Port Arthur. The Koppers Engineering & Construction Division supported oil-storage-tank foundations with pressure-creosoted piles treated by the company's Wood Preserving Division. Use of untreated piles would have necessitated a concrete pad 3½ feet thick to compensate for the difference between the water table and the level of the ground; but the creosoted-pile method reduced the thickness of the pad more than 60 per cent, with a corresponding saving in the volume of excavation and concrete. The lighter weight, too, permitted the use of fewer piles.

Koppers gives the savings in the construction of foundation pads for five 500,000-gallon tanks and one 1,500,000-gallon tank as \$33,512, or 22.7 per cent of the total cost. The following comparative specifications speak for themselves:

	Untreated Piles	Creosoted Piles
Number of piles	1,479	1,320
Length of piles (in feet)	35	35
Cubic yards of concrete	2,610	930
Pad thickness (in feet)	3.5	1.25
Tons of reinforcing rod	61.95	61.95
Cubic yards of excavation	1,930	432
Total cost:	\$180,850	\$147,338

Accidents don't happen; they are caused. Remember: the life you save may be your own.

The Moto-Patcher



—a mobile mixing unit designed for easier, more economical road and street maintenance.

for speedy, low-cost patching

● The Moto-Patcher delivers up to 10 tons per hour of freshly mixed material. The aggregate may either be shoveled into the hopper, or fed into the hopper by a small elevator (optional equipment). The mixed material is deposited on a pan of convenient height for easy shoveling, or it can be dropped directly onto the road surface. The 400 gal. tank assures an adequate supply of bitumen for uninterrupted production, making frequent stops unnecessary. The mixer, running through the bitumen tank, provides a drying action for the aggregate. If desirable, bitumen may be circulated when machine is not mixing.

Bulletin MP-51, giving specifications, flow diagram and complete information, will be sent on request.



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Convention Calendar

June 15-18—County Officials Meeting
Annual Conference, National Association of County Officials, Plaza Hotel, San Antonio, Texas. Keith L. Seegmiller, Secretary-Treasurer, 1616 Eye St., N. W., Washington 6, D. C.

June 18-20—ASCE Convention
Summer Meeting, American Society of Civil Engineers, Cosmopolitan Hotel, Denver, Colo. Don P. Reynolds, Assistant to the Secretary, American Society of Civil Engineers, 33 W. 39th St., New York 18, N. Y.

June 18-20—Soil-Stabilization Conference
Conference on Soil Stabilization, Massachusetts Institute of Technology, Cambridge 39, Mass. Prof. Harl P. Aldrich, Jr., Conference Secretary, Room 1-336, M. I. T., Cambridge 39, Mass.

June 23-27—ASTM Meeting
Annual Meeting, American Society for Testing Materials, Hotels Statler and New Yorker, New York, N. Y. Executive Secretary, ASTM, 1916 Race St., Philadelphia 3, Pa.

October 20-24—National Safety Congress
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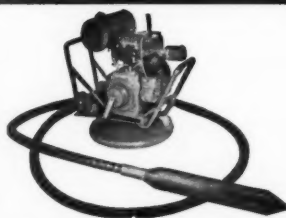
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Elkhart 9 White Mfg. Co. Indiana



For maximum conductivity the A-732 Twecotong electrode holder features a lightweight high-copper alloy.

An Electrode Holder

A 300-amp electrode holder has been introduced by Tweco Products Co., P. O. Box 666, Wichita 1, Kans. The Model A-732 Twecotong features a lightweight high-copper alloy for maximum conductivity. The raised upper lever allows plenty of room for the operator's hand with a welding rod in the jaws. Body and tip ends of the holder are insulated with Tweco's Super-Mel insulators; tip-end insulators are interchangeable. The Twecotong is 9 1/4 inches in length and will

handle from 1/8 through 1/4-inch electrodes. The welding cable may be soldered or clamped mechanically to the body of the holder.

Further information may be secured from the company by requesting Tweco-Brief Form CP-51. Or use the Request Card at page 16. Circle No. 139.

Bulletin on Rotary Pumps

A bulletin on rotary pumps for tank trucks and asphalt mixers has been prepared by George D. Roper Corp., Blackhawk Ave., Rockford, Ill. It covers the Series 3600 pumps which feature heavy-duty bearings, gage ports, outboard bearings, adjustable relief valves, and split packing glands.

The bulletin illustrates a number of applications and includes performance curves showing minimum gallons per minute and maximum brake horsepower for each size.

This literature may be obtained from the company by requesting Bulletin

278, or by using the Request Card at page 16. Circle No. 198.

Measuring Wheel Has Pistol-Grip Control

A cast-aluminum measuring wheel with a 3-foot circumference is announced by Cederholm Mfg. Co., S. Worthington Road, Worthington, Mass. The rubber-tired model TR has roller bearings in the hub, and is calibrated in feet and inches.

A special feature is the pistol-grip handle to reduce operator fatigue and provide better control. The counter, which registers up to 99,999, is mounted on the handle in clear view of the operator. All moving parts are enclosed, and the wheel is set on the right side to prevent kicking by the operator.

A towing bracket is used when the wheel is attached to the bumper of a vehicle. A snap lock holds the handle to the bracket. A remote drive is also furnished which enables the driver to



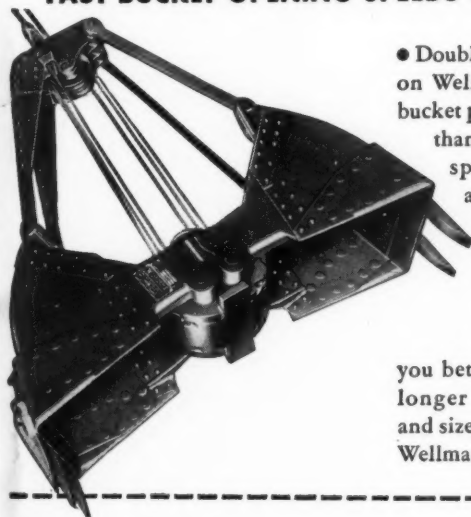
The Cederholm cast-aluminum measuring wheel can be hand operated. Or it can be towed behind a vehicle by the use of a bracket attached to the bumper. The handle of the wheel fits into the bracket and is held firmly by a snap lock.

read the distance without leaving his seat.

Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No. 144.

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FAST BUCKET OPENING SPEEDS OPERATIONS



• Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

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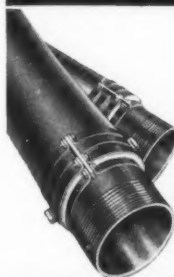
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The Econ-O-Mixer features paddle-mixing in a stationary drum. It comes in 2 and 3-yard capacities.

New Concrete Mixer With Stationary Drum

A new unit that mixes concrete in a stationary drum by means of a paddle is announced by McCoy Econ-O-Mixer Corp., 3631 Parkinson St., Detroit 10, Mich. Set at an angle, five cutting blades mince the mixture while five wiping paddles tipped with heavy

curved rubber provide agitation. This paddle combination is said to provide a thorough mix and also keep the drum clean.

The Econ-O-Mixer is made in 2 and 3-yard capacities and can be installed on any 2-ton chassis. It has an 8-foot swivel chute that swings at right angles to either side. A large 6 x 2½-foot opening in the top of the drum is said to make loading easy with any equipment.

The company points out that confining the mixing vibration inside the drum lengthens the life of both the mixer and the truck.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 167.

Ward Leonard on West Coast

Ward Leonard Electric Co., Mount Vernon, N. Y., manufacturer of generator voltage controls for excavators, has moved its Los Angeles, Calif., branch office and warehouse to new and larger

quarters at 1605 E. Olympic Blvd. Besides offering expanded office facilities, the new quarters give more storage area for stock items. Manager of the Los Angeles branch is H. E. Eales.

New Electric Drills

A line of ¼-inch portable electric drills for installation work in any material has been introduced by Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill. The drills are made with handles of pistol-grip, spade, and center-contour design. They come in free-drilling speeds of 600, 800, 1,000, 1,750, 2,500, 3,500, or 5,000 rpm.

The drills feature compactness and a weight of 3½ to 4 pounds. Lightweight aluminum construction is coupled with balanced armatures and precision-matched gears to reduce tiring vibrations. All three models have universal-type ac-dc motors and are available for either 115 or 230-volt, 25 to 60-cycle current. They can also be operated up to 200 feet from their



Three design styles and seven speeds are available in the new line of Mall ¼-inch electric drills.

power source with extension cords. Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 197.



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"Tops" in Bucket Control

As your clamshell "flies through the air with the greatest of EASE," watch the eyes of the "sidewalk superintendents" POP!

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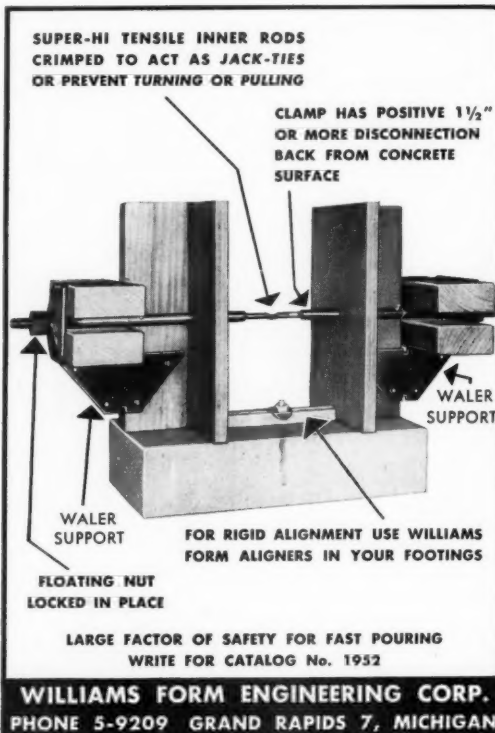
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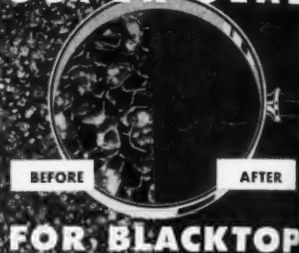
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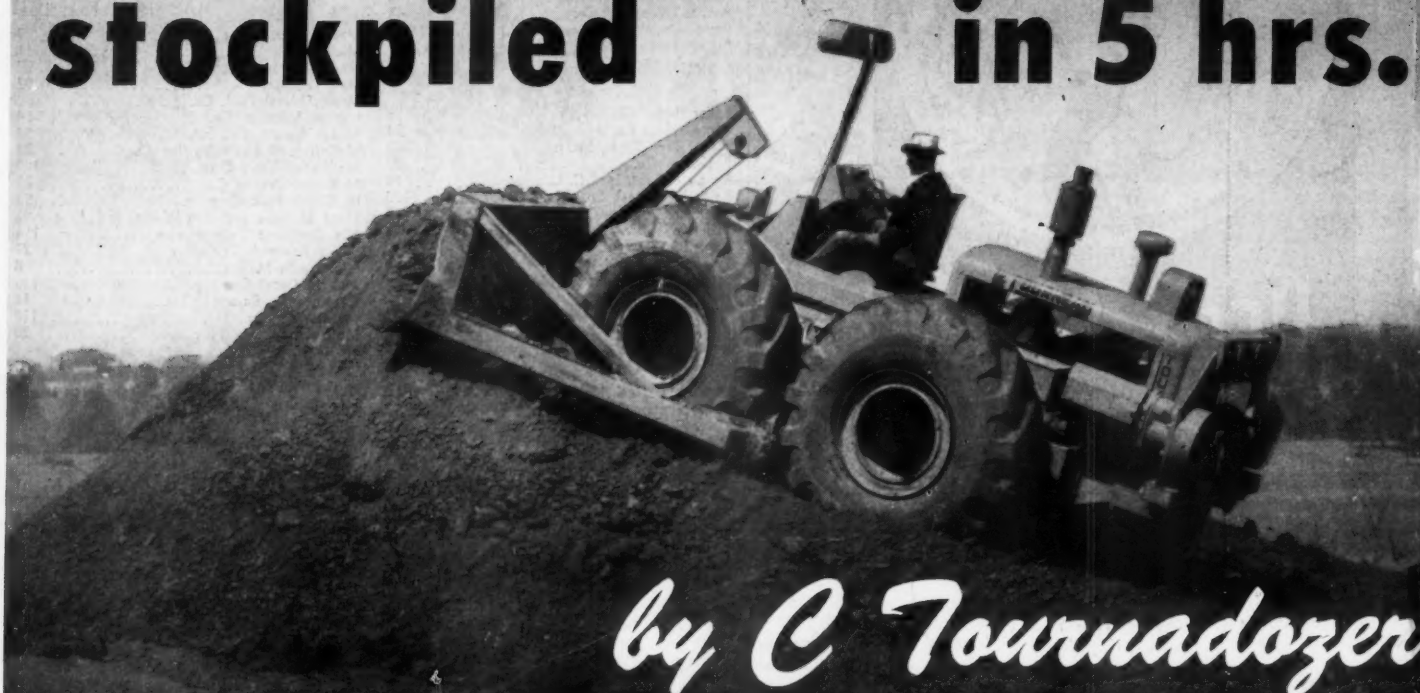
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400 yds. of clay, gravel stockpiled in 5 hrs.



by C Tournadozer



Note the level grade maintained while spreading material on this access road. The smooth operation of electric-controlled, down-pressure blade, makes it easy for operator to maintain an even grade under any conditions.

Contractors Lackey and Williams of Nacogdoches, Texas, used their new 186 h.p. C Tournadozer to stockpile a total of 1000 yds. of road material consisting of a mixture of clay and gravel. Stockpiles are later to be loaded and placed on a ¾-mile access road at the Trawick Field, now being developed by the Humble Oil Co. The "C" piled the material in 2 separate locations with one stockpile of 400 yds. and another of 600 yds. The following time study was recorded on the first.

Completes 40 trips per 60-min. hr. on 80' cycles

On 40' one-way passes, the high-speed, rubber-tired C Tournadozer moved 75 yards hourly. Instant gear-selection with push-button controls enabled the "C" to complete the 80' round-trip in 1½ minutes. The large 11'2" x 43" down-pressure blade picked up and carried approximately 2 yards per trip.

"Best equipment I ever operated"

"This is the best piece of dirtmoving equipment I have ever operated," says Partner N. H. Lackey, "it is faster, has more power and is easier to operate." Partner T. N. Williams adds, "I like the Tournadozer's speed, power and its maneuverability."

Moves 800 yards in seven hours

Prior to the Trawick job, Lackey and Williams completed various dam jobs, on one of which their high-speed C Tournadozer moved 800 yards in seven hours. Other jobs included a 35,000-yard dam at Huntsville . . . several smaller dams . . . and 30 acres of land clearing. Tournadozer fits them all.

Travels 107 miles in 6 hrs., 15 min.

After completing the Huntsville job, the 19 m.p.h. C Tournadozer traveled to Nacogdoches via Livingston, covering a distance of 107 miles over main highways, in typical traffic conditions, in 6 hrs., 15 min. This time included stops for food, etc. The "go-anywhere" mobility of the "C" makes you money on job-to-job moves by eliminating costly waiting, blocking, loading, and truck hauling, also time saved increases the total number of productive hours.

You will find C Tournadozer will speed up your scattered maintenance work, small yardage assignments as well as high production dozing. It also has versatility for year 'round profits with 10 auxiliary tools including: snow plow, logging winch, angledozzer and electric control scraper. Ask your LeTourneau Distributor or write for production reports on jobs like yours.

R. G. LeTOURNEAU, INC.
Peoria, Illinois



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